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SOVIET JOURNAL

Charles E. Kellogg

1958

X

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I

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Introduction

During the winter of 1957-58 agreements were reached between the Government of the United States and that of the Soviet Union providing for cultural exchanges in various fields of science, health, and education, including exchanges of agricultural scientists. When I returned from India in February 1958, I learned that it was planned that I should lead such a mission to the Soviet Union in the field of soil and water use. Our objectives would be to study the research programs in the academies and field experimental stations and to study the agriculture on state and collective farms so that we might see what methods were being used to bring about advanced practices on farms as well as the practices themselves.

Besides myself as chairman, the Mission included the following members:

Mr. Joseph J. Bulik
Foreign Agricultural Service
United States Department of Agriculture

Dr. L. B. Nelson, Chief,
Eastern Soil and Water Management Research Branch
Division of Soil and Water Conservation Research
Agricultural Research Service

Dr. W. H. Allaway, Assistant Director,
Division of Soil and Water Conservation Research
Agricultural Research Service

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Mr. W. W. Donnan
Principal Drainage Engineer
Division of Soil and Water Conservation Research
Agricultural Research Service (California)

Dr. D. W. Thorne, Director
Utah State Agricultural Experiment Station
Logan, Utah

Dr. M. G. Cline
Professor of Soil Science
Cornell University

This Journal is an account of my observations as taken down in notes on the spot. Commonly, these notes were taken in great haste and under far less than ideal conditions. Some of them may be inaccurate. I received some inconsistent statements about farm production. Quite likely I did not always hear and record accurately. Then too, translations, and especially double translations, can lead to error.

Certain tentative conclusions that are noted may be changed with more information and reflection. Readers of this Journal are not to quote material from it for publication without permission in writing.

Besides the photographs included with the text of these notes, there is a set of kodachrome transparencies.

Mr. W. W. Bonner
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Division of Soil and Water Conservation Research
Agricultural Research Service (California)

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July 16

We are scheduled to leave by Eastern Airlines for the first leg of our journey from Washington to New York City at 12 noon. I am called, however, at 9:45 a.m. and told that I must be at the Washington Airport at 10:30! Fortunately, I have my bags packed and am ready to leave in 3 or 4 minutes. What a hurried trip to the airport! But we all just make it, except for Cline who is to meet us in New York and Thorne whom we are to meet in Brussels.^{1/}

The wheels leave the ground from Washington at 10:45 a.m. and we are down at Idlewild Airport in New York at 12:22 p.m. It is very hot in New York. We check our baggage, which is in excess because of all the books and film we are taking to the Soviets, and have lunch in a partially air-conditioned restaurant. We are called to the gate at 3:45 p.m., but there is a slight delay. Finally we get on the plane and the wheels leave the runway at 4:43 p.m., eastern daylight time.

I have a nice dinner, a little chit-chat with the boys, and then to bed. One day passes into another over the North Atlantic.

1/ Added later: I found out afterward that the 12 o'clock plane was going to be so late that Eastern Airlines made this switch so that we might be sure to have our connection in New York.

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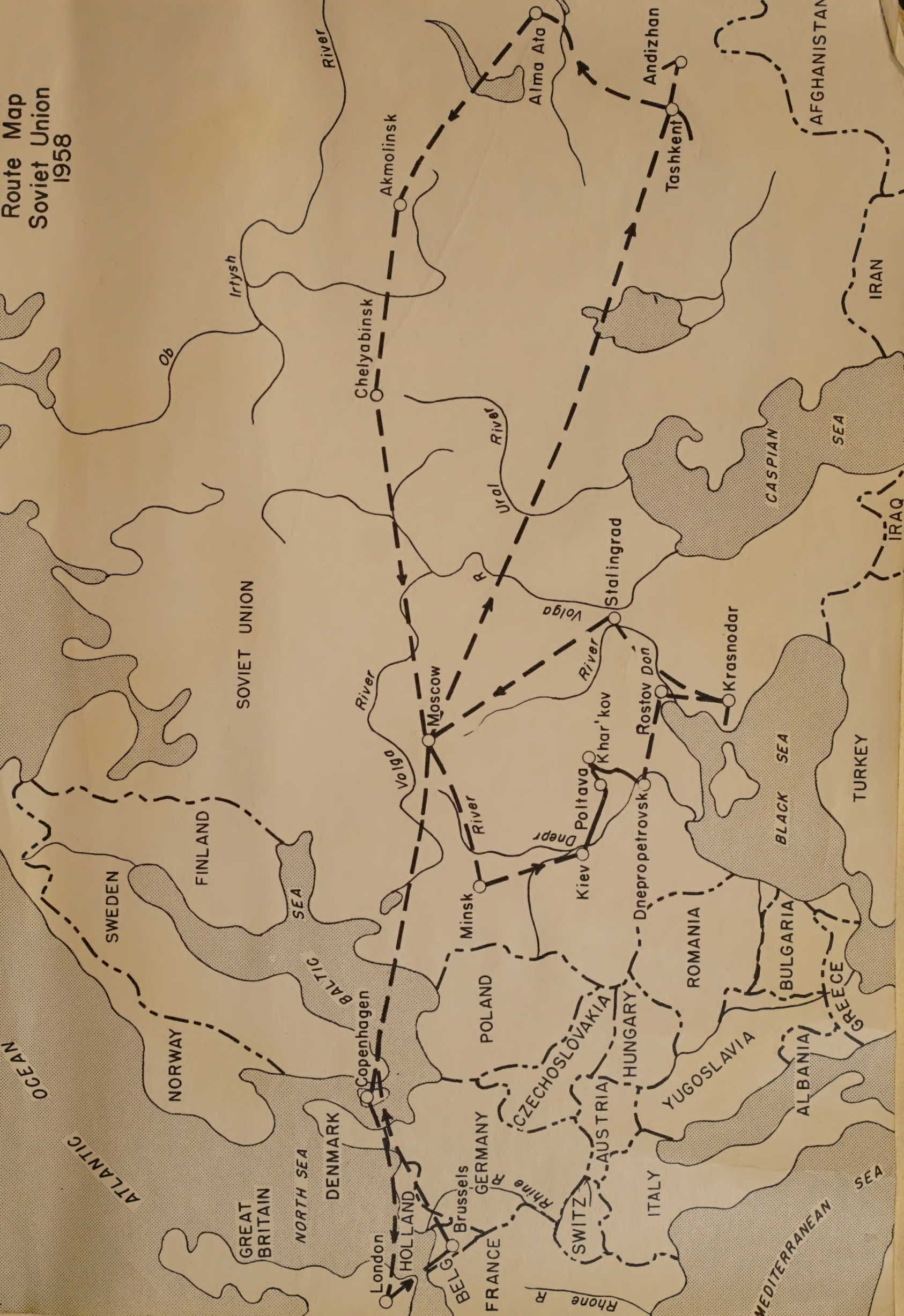
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Route Map
Soviet Union
1958



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1928



K-2505. July 19, 1958. Moscow.
Street scene near center of city.



K-2506. July 19, 1958. Moscow.
Street scene near center of city.

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Street scene near center of city.

K-2506. July 19, 1958. Moscow.
Street scene near center of city.



K-2507. July 19, 1958. Moscow.
The Kremlin wall.

K-2507

K-2507

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K-2507. July 19, 1958. Moscow.
The Kremlin wall.



K-2508. July 19, 1958. Moscow.
American Embassy the day after the "demonstration" and
breaking of windows.

K-2508. July 19, 1958. Moscow.
American Embassy the day after the "demonstration" and
breaking of windows.

July 17

I am up in broad daylight after five and a half hour's sleep, then breakfast. It always seems fast going to Europe because we set our clocks ahead 5 hours. We stop at the London airport. The air is refreshing after the heat of New York and Washington. The wheels leave the ground for Brussels at 11:11 a.m., and they are down in the Brussels airport at 12:13 p.m.

Here we meet Dr. Thorne and I give him his tickets and passport. We also see Mr. Andre G. de Pauw from our Embassy in Brussels. Several of my Belgian friends meet me, including Director-General Jurion, Dr. Fripiat, and Mr. Ameryck, of INEAC. While waiting for luggage, I also have a little chat with Dirk Tavernier who had come in to meet me. His father, René, had left just the day before for the Belgian Congo.

Dr. Fripiat takes several of us to our hotel, the Amigo, which is a new one built for use this year of the Fair. We deposit our luggage and Dr. Fripiat takes us out to the Fair where I try to get some pictures. We find enormous crowds and many automobiles; it seems that nearly everyone has a camera.

Of course, we have only a short time. I go into the American exhibit which, on the whole, I like very much. There had been complaints that the Americans did not show enough machinery, but I do not agree. Everybody knows that America has a lot of machinery and I think the exhibit does well in creating a relaxed and pleasant atmosphere and in showing something of the cultural side of American life.

July 17

I am up in broad daylight after five and a half hour's sleep.
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life.

We also visit the Soviet exhibit where there is a great deal of machinery of all sorts including copies of modern European and American automobiles. It would not surprise me any if these were the only examples built in the Soviet Union, although I do not know. I have the impression that the Soviets are trying a bit too hard. But they do have some very nice exhibits and I am interested to look at the agricultural ones and at the agricultural machinery they have parked outside.

I take a quick look at the Czechoslovakian pavilion to see the very nice crystal I had heard about. But it does not take long to get very tired at this sort of thing.

Near the dinner hour I go through the excellent exhibit of agriculture and native life in the Belgian Congo. After this I have a fine dinner with Director-General and Madame Jurion and Dr. and Madame Fripiat. Although I am getting tired they rather insist that we take a bus trip around the fairgrounds to see the general layout under all the lights. It is an enormous place and very beautiful; but one needs at least a week.

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July 18

After breakfast and some letters I take a little walk including a visit to the beautiful Hotel de Ville of Brussels.

We get out to the airport at 10:30 for our trip to Moscow and check in, except for Dr. Thorne. Somehow he failed to understand the arrangements and just barely makes it.

We pass through security and into a new Russian jet of Aerflot. This plane is called TU 104 - a beautiful jet with two engines.

Today is warm and sunny and it is warm in the plane while we wait for the take-off.

The wheels are up at 11:55 a.m., and in a few minutes we are up to about 9 or 10 thousand meters. Now it is cool and the plane is very smooth indeed! We go north towards Copenhagen.

I go up into the pilot's cabin. Never have I seen so many instruments in one place! How in the world anyone can keep track of all these is beyond me. The navigator sits forward of the pilot and co-pilot in a kind of nose made from what looks like glass and what I suppose to be plastic. The pilot gives me the following statistics: Altitude, 35,000 feet; temperature outside, -32°C; and speed, 540 miles per hour plus 36 miles per hour tail wind.

During most of the trip we are above clouds. The lunch is nice but less fancy than on the other European and American lines. I have bread, a roll, cheese, an orange, beefsteak, potatoes, peas, caviar, cake, and tea. I put my watch ahead another two hours and the wheels are down in Moscow at 4:58. No one is on hand to meet us from our

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After breakfast and some letters I take a little walk including a visit to the beautiful Hotel de Ville of Brussels. We get out to the airport at 10:30 for our trip to Moscow and check in, except for Dr. Thorne. Somehow he failed to understand the arrangements and just barely makes it. We pass through security and into a new Russian jet of Aeroflot. This plane is called TU 104 - a beautiful jet with two engines. Today is warm and sunny and it is warm in the plane while we wait for the take-off. The wheels are up at 11:25 a.m., and in a few minutes we are up to about 9 or 10 thousand meters. Now it is cool and the plane is very smooth indeed! We go north towards Copenhagen. I go up into the pilot's cabin. Never have I seen so many instruments in one place! Now in the world anyone can keep track of all these is beyond me. The navigator sits forward of the pilot and co-pilot in a kind of nose made from what looks like glass and what I suppose to be plastic. The pilot gives me the following statistics: Altitude, 35,000 feet; temperature outside, -32°C; and speed, 540 miles per hour plus 36 miles per hour tail wind. During most of the trip we are above clouds. The lunch is nice but less fancy than on the other European and American lines. I have bread, a roll, cheese, an orange, beefsteak, potatoes, peas, caviar, cake, and tea. I put my watch ahead another two hours and the wheels are down in Moscow at 4:25. No one is on hand to meet us from our

Embassy, but we are met by several high officers of the Ministry of Agriculture and of the Academy of Sciences of the USSR including the following:

A. N. Askochinski, Member of the Agricultural Academy and
of the Ministry of Agriculture

Academician Tyurin, Director of the Dokuchaiev Institute
of Soil Science

Mr. Kharchenko, Head of the Foreign Department of the
Ministry of Agriculture

Mr. Yakushkin, of the Institute of Agricultural Economics

Mme. Lily Baranova, from the All-Union Agricultural Exhibition

I have a long talk with Tyurin while we wait for passports and luggage. We get into the cars about 6:20 p.m. and are driven to the Moskva Hotel.

We go down for dinner at 8 o'clock and I find Dr. Rodenhiser, Dr. Erlanson, Dr. Magness, and other members of the Crops Mission. They say that their visits are going fine.

I had had a message to call the Embassy at the air station and I had tried again at the hotel but discovered they had given me the wrong number. Mr. Bulik was able to get the right number and we discovered that while we were landing at the Moscow airport a managed demonstration of Soviet workers had assaulted our Embassy and broken many windows. It is curious how this kind of thing happens while we were receiving such a warm and kind welcome from highly placed Soviet scientists and administrators.

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discovered that while we were landing at the Moscow airport a

managed demonstration of Soviet workers had assaulted our Embassy

and broken many windows. It is curious how this kind of thing happens

while we were receiving such a warm and kind welcome from highly

placed Soviet scientists and administrators.

We have a very slow dinner. Tom Venables, our agricultural attaché in Moscow, comes in and says that 10,000 demonstrated before the U. S. Embassy today and broke 300 panes of glass - all in fun!^{2/}

I do my washing and write letters after dinner. Mr. Bulik comes in quite late. He tells me a story of two students who spoke to him on the street this evening. He asked them if they were at the American Embassy. They replied they had not been because they were students on leave and not workers and so were not required to go! He asked them why they wanted to talk to Americans and one of them replied: "We live too much in our own soup and need to talk with others."

^{2/} Added later: Other embassy people told me that the police worked hard to control the demonstration. Apparently the ministry controlling the police opposed it even though it was stimulated by other ministry officials through the trade union. Yet certainly everyone has been very friendly to me so far.

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by other ministry officials through the trade union. Yet certainly

everyone has been very friendly to me so far.

July 19

This morning is warm and sunny. We go out to the Embassy. In Venables' office I see the telegram sent back to the State Department saying that our group arrived safely and that we were met by scientists and high officials of the Academy and of the Agricultural Ministry. I am a bit sorry that they did not send the telegram through commercial channels just as I had given it to them last night. This one went through code and will be a long time getting to our people.

Venables talks with us awhile and says that he understands some recent changes have been made.

1. The peasants no longer need to give any part of their income from their small individual plots to the state. What they get from these family plots they can consume or take to the local farmers' market or sell to the state at higher prices than formerly.

2. In April 1958 there was issued a new decree for reorganization of the machine and tractor stations. Formerly these stations received produce from the farms to deliver to the state for doing the machine work on the farm. Now the machines have been, or are being transferred, to the farms. The farms buy them. The stations are now called repair and technical stations. They not only repair machines for the collectives, but also help service the purchase and delivery of supplies of fertilizer and maintain some heavy machines for drainage and the like that would not be needed permanently on any one farm.

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3. On July 1 a new system for procuring agricultural supplies, is supposed to have been put into effect. The Gosplan (the All-Union Central Planning Agency) draws up procurement plans and these go down through the various levels of the government. Presumably they are based on the needs of the people. Compulsory deliveries for whole farms are abolished. He doesn't think that this will make much difference in procurement, but that farmers will now receive higher prices in contrast to what they received formerly. Under the old scheme the obligatory deliveries get rather low prices and deliveries above that base get relatively higher prices. The new prices are a compromise and in all cases equal to or above the old prices for comparable deliveries. Then of course, out of this increased income the farms must buy their own machinery and maintain it. He thinks that possibly somewhat more products may find their way into the "free" market.

4. He says that farmers also have cooperatives to handle the products in the "free" market. There are some consumer cooperatives, but he does not think they are very good. Prices in them are about like those in the "free" market and thus above those of the state stores.

We have a brief visit with Ambassador Thompson and after some general discussion leave about 11:50. We arrive at the Ministry of Agriculture about 12:15 p.m. for our first conference on the itinerary in the Soviet Union. Mr. Venables accompanies us.

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We have a short speech by Mr. Askochinski, a vice-minister. He then turns to Mr. V. M. Melnikov who is to go with us on the tour. Also present is Mr. A. F. Kharchenko, Director of Scientific Operations for foreign countries. Several other Soviet officials whose names I am unable to get clearly are present. At this discussion I am introduced to our translator who is to be with us during the trip, Mr. Edward Baranov.

I have a very friendly discussion with the Vice-Minister about the whole plan. I want to be sure that everything is settled clearly in both Russian and English before we leave. I ask that most of the proposed visits to power stations, factories, and the like be eliminated so that we can concentrate on farms and research institutes. I present the Vice-Minister with a copy of our most recent yearbook on soils and open up the discussion of an exchange of agricultural films. He doesn't know what films they have available but will look into it and discuss them in detail on my return. So I shall leave the films in the Embassy for the present. The itinerary prepared by the Ministry follows:

July 18 Friday	Arrival in Moscow Accommodation in the hotel
July 19 Saturday	Conference in the Ministry of Agriculture of the USSR to discuss the program and the itinerary. Visit to the All-Union Agricultural Exhibition
July 20 Sunday	Sightseeing of Moscow. Excursion to the Kremlin
July 21 Monday	Visit to the All-Union Agricultural Academy of Agricultural Science. Visits to the Soils Institute of the USSR Academy of Sciences

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tour. Also present is Mr. A. F. Kharchenko, Director of Scientific
Operations for foreign countries. Several other Soviet officials
whose names I am unable to get clearly are present. At this dis-
cussion I am introduced to our translator who is to be with us
during the trip, Mr. Edward Barkov.
I have a very friendly discussion with the Vice-Minister about
the whole plan. I want to be sure that everything is settled clearly
in both Russian and English before we leave. I ask that most of the
proposed visits to power stations, factories, and the like be eliminated
so that we can concentrate on farms and research institutes. I present
the Vice-Minister with a copy of our most recent yearbook on soils
and open up the discussion of an exchange of agricultural films.
He doesn't know what films they have available but will look into
it and discuss them in detail on my return. So I shall leave the
film in the Embassy for the present. The itinerary prepared by
the Ministry follows:

July 18	Friday	Arrival in Moscow Accommodation in the hotel
July 19	Saturday	Conference in the Ministry of Agriculture of the USSR to discuss the program and the itinerary. Visit to the All-Union Agricultural Exhibition
July 20	Sunday	Sightseeing of Moscow. Excursion to the Kremlin
July 21	Monday	Visit to the All-Union Agricultural Academy of Agricultural Science. Visit to the Soil Institute of the USSR Academy of Sciences

July 22 Tuesday	Visit to the Timiriazev Agricultural Academy. Visit to the Department of Pedology of the Moscow State University.
July 23 Wednesday	Leaving for Minsk (by air) Arrival in Minsk
July 24-26 Thursday Friday Saturday	Belorussian S.S.R. Visits to: Belorussian Institute of Melioration and Water Economy, Minsk experimental farm, Belorussian Institute for Projecting Water Economy and Hydro- technical Structures (Belgiprovdhoz). Drainage area "Sloust" Smolevitsk machine-melioration station, A collective farm.
July 26 Saturday	Leaving for Kiev by air at 12:55.
July 27 Sunday	Kiev region Visits to: Lenin collective farm, Dymersk district Irpensk drainage system The Exhibition of modern methods in people's economy of the Ukrainian S.S.R.
July 28 Monday	Departure to Poltava by car Visits to: Poltava region state experimental station Lenin collective farm, Poltavsk district, Poltavsk region.
July 29 Tuesday	Leaving for Dnepropetrovsk via Kharkov by car. Lunch in Kharkov. Arrival in Dnepropetrovsk. Visit to the glass house farm of the K. Libknecht plant.
July 30 Wednesday	Dnepropetrovsk region Visits to: Ordzhonikidze collective farm, Nikopolsk district Gorky collective farm, Nikopolsk district The state farm "Dneprovskii" Kamensk-Dneprovskii district, Zaporozhje region.
July 31 Thursday	Leaving Dnepropetrovsk for Rostov (by air) Arrival in Rostov.

Visit to the Timiriazov Agricultural Academy. Visit to the Department of Pedology of the Moscow State University.	July 22 Tuesday
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Kiev region Visits to: Lenin collective farm, Dnyprosk district Irkansk drainage system The Exhibition of modern methods in people's economy of the Ukrainian S.S.R.	July 27 Sunday
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Dnepropetrovsk region Visits to: Orshenichsk collective farm, Nikopol district Gorky collective farm, Nikopol district The state farm "Dneprovskii" Kamensk-Dneprovskii district, Zaporozh'e region.	July 30 Wednesday
Leaving Dnepropetrovsk for Rostov (by air) Arrival in Rostov.	July 31 Thursday

August 1 Friday	Rostov region Visits to: The state farm "Koisugskii" Bataisk district The state farm "Krasnyi Sad" Bataisk district Lenin collective farm, Samarsk district
August 2 Saturday	Leaving Rostov for Krasnodar (by air) Arriving in Krasnodar
August 3 Sunday	Krasnodar territory Visits to: Experimental farm of the rice experimental station, Krasnoarmeisk district The rice state farm "Krasnoarmeiskii" Michurin collective farm.
August 4 Monday	Leaving Krasnodar for Stalingrad (by air) Arrival in Stalingrad.
August 5-6 Tuesday Wednesday	Stalingrad region Visits to: The state farm "Volgo-Don" Gorodistchensk district, Stalingrad Agricultural Institute Experimental farm of the All-Union Research Melioration Institute Stalingrad Hydro-Electric Station Shelterbelts.
August 7-13 Tuesday Wednesday	Arrival in Tashkent Uzbek S.S.R. Visits to: Tuja-Buguz Reservoir Middle Asia Research Irrigation Institute Farhad hydroelectric station Dzerzhinskii collective farm, Begovatsk district Tashkent region Farms in Golodnaya Steppe
August 13 Wednesday	Leaving Tashkent for Akmolinsk via Alma-Ata (by air) Arrival in Akmolinsk
August 14 Thursday	Akmolinsk region Visits to: Zhdanov collective farm, Shortandinsk district The collective farm "XVIII let Kazahstana" the same district. The state farm "Kazah Central Execut. Committee" the same district.

Rostov region Visits to: The state farm "Koyugskii," Batalsk district The state farm "Krasnyi Sad," Batalsk district Lenin collective farm, Batalsk district	August 1 Friday
Leaving Rostov for Krasnodar (by air) Arriving in Krasnodar	August 2 Saturday
Krasnodar territory Visits to: Experimental farm of the rice experimental station, Krasnodarsk district The rice state farm "Krasnodarskii" Michurin collective farm.	August 3 Sunday
Leaving Krasnodar for Stalingrad (by air) Arriving in Stalingrad.	August 4 Monday
Stalingrad region Visits to: The state farm "Volgo-Don," Gorodishevsk district, Stalingrad Agricultural Institute Experimental farm of the All-Union Research Malvarion Institute Stalingrad Hydro-Electric Station Shcherbinka.	August 5-6 Tuesday Wednesday
Arriving in Tashkent Uzbek S.S.R. Visits to: Tuz-A-Bugur Reservoir Middle Asia Research Irrigation Institute Farhad hydroelectric station Beshchinskii collective farm, Begovat district Tashkent region Farms in Golodnyy Steppe	August 7-13 Tuesday Wednesday
Leaving Tashkent for Almalyk via Alma-Ata (by air) Arriving in Almalyk	August 13 Wednesday
Almalyk region Visits to: Zhdanov collective farm, Shortandyshsk district The collective farm "Kvili iet Kazanets" the same district. The state farm "Kazakh Central Experiment Committee" the same district.	August 14 Thursday

August 15 Friday evening	Leaving Akmolinsk for Moscow (by air)
August 16 Saturday	Arrival in Moscow
August 17 Sunday	Visit to the Tretyakov Art Gallery Theatre in the evening
August 18 Monday	Conference in the Ministry of Agriculture of the U.S.S.R.
August 19 Tuesday	Free day
August 20 Wednesday	Leaving Moscow

(Added later: This was not followed exactly in all detail)

We have a preliminary discussion with representatives of Intourist. They will be prepared to discuss with us a little later the costs and conditions of alternative ways to carry out the itinerary that has just been agreed upon.

We go out to visit the famous agricultural fair. I notice many more automobiles in Moscow than when I was here in 1945. The streets are wide and clean. The city is much brighter than before, but still it is a bit drab, especially the shops. This is a beautiful day as we drive out to the fair.

This fair is a remarkable institution. There are many permanent buildings housing large functional exhibits and buildings for each of the 15 republics. It is beautifully landscaped with statues, fountains, and gardens. The whole development must have cost a great deal of money. We stop at a beautiful exhibit that shows in detail

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August 19	Tuesday	Free day
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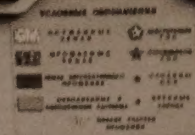
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ВОДНОЕ ХОЗЯЙСТВО СССР

ВЕС ОБЩЕЙ МОЩНОСТИ
ЭЛЕКТРОСТАНЦИЙ В 2,7 РАЗА.

АВРЕЛ 1958 ГОДА

УВЕЛИЧИТЬ ТРАНСПОРТНОЕ ВОЗМОЖНОСТИ
СУДОХОДНЫХ ПУТЕЙ



102 ГЭС
СРЕДНЕЙ И БОЛЬШОЙ
МОЩНОСТИ И ДЕСЯТИ ТЫСЯЧ
СЕЛЬСКИХ ГЭС ДАЮТ ЭНЕРГИЮ
ПРОМЫШЛЕННОСТИ И
СЕЛЬСКОМУ ХОЗЯЙСТВУ.

РОСТ
ВЫРАБОТЫ СРЕДНИХ
И МАЛЫХ ГЭС
В МАРЕ 1957 Г.

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БОЛЕЕ 100 МЛН.
ГЕКТАРОВ ЗЕМЛИ
ОРОШЕНО, ОСУШЕНО
И СВОБОДНО
В СОВЕТСКОМ
СОЮЗЕ.

РОСТ
МЕЛКОРИВЯННЫХ
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СОВЕТСКОЙ ВЛАСТИ

K-2509. July 19, 1958. Moscow. Exhibit of water in the USSR at Agricultural Fair.

the progress of water development and irrigation. (K-2509)
My guide tells me that one canal in the southern part of the country is used to irrigate 500,000 hectares.^{3/}

We are shown methods for taking the suspended materials from the river water. This is apparently a big problem since many of the rivers are rich in silt and fine sand because of the great amount of loess, even on mountain slopes.

We are shown many working models, including one in which the water pump for irrigation is on a boat on the river. This pump moves the water from the river into a basin just over its bank and from thence it flows by gravity to the fields.

I see beautiful exhibits and movies of the drainage work near Minsk. This exhibit shows open drains about 10 to 25 meters apart with mole drains between. They are using clay and wooden drains and also some made from glass and bitumin. They have some drainage with deep tile and then mole drains above the tile.

One can hardly resist taking pictures of these beautiful exhibits. I am particularly impressed with the exhibits for Uzbekistan. I am shown some samples of hybrid sorghum six meters high that is said to yield 120 tons per hectare!

^{3/} A table to help in the conversion of metric units to American units comes just at the end of the Journal.

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3\ A cable to help in the conversion of metric units to American

units comes just at the end of the Journal.

The main fountain is a gorgeous affair with 16 golden girls, one for each republic, clad in one of the principal local costumes. (Since the reorganization there are now only 15 republics but the fountain has 16 golden girls).

In the main hall I see a large soil map and monoliths of the principal soil types (using soil types here in the Russian sense of continental soil types). (K-2512). Officials of the fair give each of us a little badge and me a huge bronze medal.

Like the Brussels Fair one really should have a week at this gorgeous fair. I gather that state and collective farms from all over the Union send in products and compete for prizes. I gather too, that many farm people get as extra prizes for their work an opportunity to come to Moscow and visit this great exhibition. Certainly it is well patronized.

We go back to the U. S. Embassy for dinner chez Venables. As I sit down in his apartment I realize how tired I am, yet we saw but a tiny flash of the many functional exhibits and beautiful pavilions. Each one of these represents the style of architecture of some part of the Union.

We have a pleasant but slow buffet dinner. Finally I gather enough courage to get a car to take me back to the hotel around 10:30. Again I do my laundry, write some letters, fix up my cameras, and go to bed at the end of a pleasant day.

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K-2511. July 19, 1958. Moscow. View of central part of Agricultural Fair.



K-2512. July 19, 1958. Moscow. Soil map in main building.

II-7

K-2511. July 19, 1958. Moscow. View of central part of Agricultural Fair.

K-2512. July 19, 1958. Moscow. Soil map in main building.

July 20 (Sunday)

This is another warm sunny morning. After a slow breakfast our guides, Mr. Melnikov and Edward Baranov (hereafter referred to as Eddie), take us on a visit to the Kremlin. There is already an enormously long line waiting to enter the tomb and see the figures of Lenin and Stalin. We take a lot of pictures of the buildings and of the crowds. We get a good look at a famous museum in which are exhibited the clothing, coaches, uniforms, jewelry, and so on of former royalty and church leaders. We step into some of the cathedrals for a moment and then go out into the Red Square (K-2501) where we are taken through the line and into the tomb (K-2502). The place is well guarded, nobody says anything, and one must walk along briskly. I have a guilty feeling of breaking into this line ahead of people who have waited for many long hours, but Eddie says that this is normal procedure for a delegation.

We have lunch at the Moskva Hotel and then take a tour of the city with Mr. Melnikov as our host. We see the famous Bolshoi Opera House, which is now dark in summer.

We drive along the Moskva River and have a beautiful view of the great buildings within the Kremlin. We pass through a part of Gorki Park for "rest and culture." This is something like our recreational beaches and I suspect it would be very hard to get either rest or culture, although part of it has permanent gardens that are nice.

July 20 (Sunday)

This is another very sunny morning. After a slow breakfast our guides, Mr. Melnikov and Edward Baranov (hereafter referred to as Eddie), take us on a visit to the Kremlin. There is already an enormously long line waiting to enter the tomb and see the figures of Lenin and Stalin. We take a lot of pictures of the buildings and of the crowds. We get a good look at a famous museum in which are exhibited the clothing, coaches, uniforms, jewelry, and so on of former royalty and church leaders. We step into some of the cathedrals for a moment and then go out into Red Square (K-2501) where we are taken through the line and into the tomb (K-2502). The place is well guarded, nobody says anything, and one must walk along briskly. I have a guilty feeling of breaking into this line ahead of people who have waited for many long hours, but Eddie says that this is normal procedure for a delegation.

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K-2497. July 20, 1958. Moscow
Some palaces in the Kremlin.



K-2498. July 20, 1958. Moscow.
Old cannon in Kremlin.

K-2497

2497

I-1

K-2497. July 20, 1958. Moscow.
Some pictures in the Kremlin.

K-2498

I-2

K-2498. July 20, 1958. Moscow.
Old cannon in Kremlin.



K-2499. July 20, 1958. Moscow.
Old bell in the Kremlin.



K-2500. July 20, 1958. Moscow. Crowd waiting
to enter museum within the Kremlin.
Foreground: Bulik, Eddie, Malnikov,
Cline, and Donnan.

K-2499

K-2499

I-3

K-2499. July 20, 1958. Moscow.
Old bell in the Kremlin.

K-2500

K-2500

I-4

K-2500. July 20, 1958. Moscow. Crowd waiting
to enter museum within the Kremlin.
Foreground: Bulin, Evtie, Malinkov,
Gline, and Dornan.



K-2501. July 20, 1958. Moscow.
The Red Square.



K-2502. July 20, 1958. Moscow. View in
Red Square, with people lined up
to enter tomb of Lenin and Stalin.

K-2501

I-5

K-2501. July 20, 1928. Moscow.
The Red Square.

K-2502

K-2502

I-6

K-2502. July 20, 1928. Moscow. View in
Red Square, with people lined up
to enter tomb of Lenin and Stalin.

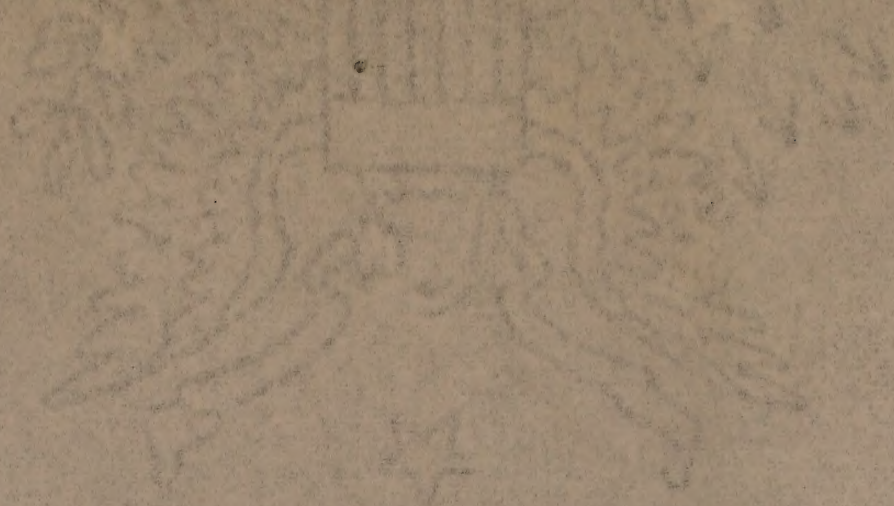
We drive to a large apartment area. I suggest that I should like to see an apartment so they take me through an experimental area where they are trying many sorts of prefabricated building sections in trying to get the maximum of room, maximum of warmth in winter, and maximum of coolness in summer. I try some pictures and then go into a little flat that has a total area of 55 square meters for three rooms and a kitchen. I am told that the family pays 96 rubles a month, with heat, refrigeration, light, and gas. The rate is 58 rubles without heat and light. (Very roughly the exchange is 10 rubles for \$1, but since prices are controlled by the government some things, like rent, seem low whereas other things seem very high. The official exchange is 4 rubles for \$1, but this is purely artificial.) I am told that both parents work and that the husband gets 2,500 rubles per month and the wife 2,200 rubles a month. This figures out that rent is about 2 percent of salary, which would be very low in the United States. The income tax is 13 percent. So far as I could tell there were only one or two children in this family, but I noticed two old people. Families without children pay more rent than those with children.

We drive by the University of Moscow. The central building is huge and spectacular. (K-2640). It makes one think a bit of Rockefeller Center in New York City. The wings of the building are used as apartments for students. Besides this main building there are other buildings for physics, chemistry, soil science,

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 meters for three rooms and a kitchen. I am told that the family
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 there are other buildings for physics, chemistry, soil science,



K-2640. July 20, 1958. Moscow.
Part of the University of Moscow.



[Faint, illegible text on a rectangular piece of paper, held in place by four yellow tape corners.]

Part of the University of Moscow.
July 20, 1953. Moscow.
K-5640.

and other departments. I am told that the University has 18,000 day students, 2,000 graduate students, and 4,000 evening students. Included in these figures are 2,000 foreign students from 16 countries, with, of course, special emphasis on China, Korea, and other countries having close relations with the Soviet Union. But I understand that some exchanges are to be arranged between the universities of Moscow and Leningrad on the one hand, and Harvard and Columbia on the other.

By way of several points of interest we return to the hotel for dinner at 7:30. After a bit of chit chat I notice that some 29 Iowa farmers have just come into the hotel. We ask them whether they have been to the American Embassy. They reply, "No, it isn't on our program!" I strongly urge them to go to the Embassy and give them what I hope are sufficient reasons.

In the evening we can see fireworks from our window along with many searchlights in the sky. This day had been set aside to honor the Red Air Force. Soon to bed.

19

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July 21

This promises to be another bright and sunny day. Shortly after breakfast we leave for the Lenin Academy of Agricultural Sciences and reach there about 10:25.

This is the highest academy for agricultural science in the Union.

Our hosts include the following:

1. Sinyagin, I. I. - Head Scientific Secretary of the Presidium of the Academy. Professor, Doctor of Agricultural Sciences.
2. Sokolov, N. S. - Vice Academic-Secretary of the Agronomy Section. Professor.
3. Sotnikov, V. P. - Vice Chairman of the Council for Working Out Systems of Agronomy for the Zones of the Country. Candidate of Agricultural Sciences.
4. Frantsesson, V. A. - Vice Director of the All-Union Scientific-Research Institute of Fertilizers and Agro-Soils. Doctor of Agricultural Sciences.
5. Karpinskii, N. P. - Director of Laboratory of Soils of the Non-Black Soil Zones of the All-Union Scientific-Research Institute of Fertilizers and Agro-Soils. Professor, Doctor of Agricultural Sciences.
6. Mikhailov, N. N. - Director of the Section of Internal Relationships. Candidate of Agricultural Sciences.

They have about 900 professional research people and 100 advanced students working with them.

I am shown a map of the many institutes that they have in this Academy. A great many of these are organized around crops, although they also deal with soils and other agro-technical aspects of the production of crops. Thus there are institutes for sugarbeets, oil-bearing plants, shag and tobacco, flax, corn, fiber crops other

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than cotton, and many others. Each one also deals with soil amelioration, including fertilizers, and the like. The main institutes deal with the problems for the whole country. Besides the crop institutes there are others for cattle breeding, electrification, and the like.

Many of the republics have their own academies of agricultural sciences such as Ukrainia, Uzbekistan, Belorussia, Georgia, and Kazakhstan. At Minsk there is a special institute on water and swamp reclamation. At Tashkent there is a special one on irrigation. I am told that each of the academies in the republics differ somewhat from those in the others. A special council of the Lenin Academy here coordinates and guides the work of all the academies and helps outline the work for each academy including the cotton-growing research of Uzbekistan, irrigation research in Uzbekistan, drainage in Belorussia, and so on.

This Academy has 75 academicians and 75 corresponding members. In addition, there are some honorary members and 13 corresponding members from countries abroad. At the head of the Academy is a presidium consisting of 12 members elected for 5 years. This includes the president, 3 vice-presidents, a chief scientific section, and 6 members who are secretaries of the 6 sections as follows:

1. Agronomy
2. Animal husbandry, including veterinary science
3. Electrification and mechanization
4. Hydro-techniques and amelioration (Askochinski)
5. Forestry on farms, such as shelterbelts and the like
6. Economics and organization of farms.

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growing research of Uzbekistan, irrigation research in Uzbekistan,
drainage in Belorussia, and so on.

This Academy has 75 academicians and 75 corresponding members.
In addition, there are some honorary members and 13 corresponding
members from countries abroad. At the head of the Academy is a
presidium consisting of 15 members elected for 5 years. This includes
the president, 3 vice-presidents, a chief scientific section, and
6 members who are secretaries of the 6 sections as follows:

1. Astronomy
2. Animal husbandry, including veterinary science
3. Electrification and mechanization
4. Hydro-techniques and amelioration (Askaniya)
5. Forestry on farms, such as shelterbelts and the like
6. Economics and organization of farms.

They explain that they have several publications and several scientific magazines. There is a general monthly magazine, an information bulletin on agricultural science, Agro-biology edited by Lysenko, and Pedology (Pochvovedenie) edited at the Dokuchaiev Institute. The libraries of the Academy make published summaries of all foreign papers. Besides they furnish material to the general academy on biology. These summaries come out twice monthly and contain abstracts of all scientific work in the world. The summaries are made by special technical institutes. In addition, the Ministry of Agriculture issues many publications. They now have about 40 agricultural magazines and several on biology. Then too, the republics publish their own agricultural journals. The Academy publishes many special bulletins and sponsors many books written by its members and staff.

During the last 3 years the budget for this Academy has increased 30 percent. The budget is defended each year before a special committee of the presidium of the Supreme Soviet, which is roughly comparable to our Congress. I ask the director what items he is giving special emphasis with his increased funds. His reply nearly throws me over: "We are emphasizing scientific work in genetics and plant breeding; you know we have been very backward in that field." (But it would have been worth his position to have said this before Stalin died while Lysenko had his great influence.) Some of their new increase will go into research on the use of isotopes in agriculture and they expect to emphasize research on soil erosion and drought prevention.

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I ask him to elaborate this last item a bit and he discusses research on how to increase water storage in the soil during the autumn and winter, including ways to keep snow in the fields. He also wonders whether they cannot improve the ability of soils to take in water from melting snow. Then they hope to make better use of summer rainfall through better varieties of crops and better timing of crop sowing. They expect to do more work on cultivation of clean fallow, including deep plowing without moldboards to not more than 30 centimeters.

We also discuss methods of cultivation that leave residues on those soils that are subject to blowing. Recently they have had some studies on the effects of organic chemicals on producing soil structure.

We are told that chemical weed killers are being used on corn, flax, and small grain and that they are being tried on vegetables.

We are also told that they have a special factory at Kiev for manufacturing superphosphate containing manganese.

We talk a bit about soil maps. He says that most soil maps for farm use are on scales of 1:1,000 to 1:10,000. (Added later: I saw only one map at 1:1,000, and that of an experimental farm) The work is said to be completed in several regions. (I think he means oblasts.) The detailed soil maps of state and collective farms are not published as such. It is said that each collective farm receives not only the basic soil map, but also agro-chemical

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maps, such as those showing amounts of available phosphorus in the soil, organic matter, potassium, pH, and the like. These maps are made by soil scientists and interpreted jointly with the local agronomists.

The agricultural administration of each oblast and of ^{the} district or rayon office help in giving technical assistance to the collective farms. For some kinds of technical assistance, farmers need to reimburse the agricultural departments. Where the local departments or institutes lack qualified engineers or scientists they may have help from the ministries of agriculture in the republics. Where engineering practices are involved these men from the various administrations investigate the farm and make a plan. When this plan is satisfactory to the people on the farm the farm then applies to a special building organization to carry out any construction called for.

With drainage schemes, the government pays all costs; but 50 percent of these are later paid back by the farm. When new land is reclaimed, such as in the Hungry Steppe near Tashkent, the government pays all the initial cost. But the improvement of an existing irrigation system is paid partly by the government and partly by the farm. Where the farms pay, they may have credit and some 10 years before the loan must all be repaid. Ordinary land-leveling in old irrigated areas is also paid for by the government. Detailed arrangements and schemes vary in the different republics and even among the oblasts within a republic.

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I ask about demonstrations. The government gives neither fertilizer nor seed for demonstration but uses state farms and good collective farms for demonstration to the poorer farms. Sometimes an agricultural research institute demonstrates new practices on one or more collective farms.

We ask about their bacterial fertilizers. They have a special institute on these bacterial fertilizers in Leningrad. They supply mainly 3 types:

1. Cultures of nodule-forming bacteria (Rhizobium) that grow on the roots of legumes and are used for treating seeds.

2. Azotogen or Azotobacter cultures used for treating seeds. Apparently the effects are not fully understood. These are said to be effective in some cases and not in others. New investigations are underway.

3. Cultures of a phosphorus bacteria, called phospho-bacterin (Megatherium vipphosphatieum), are used to treat seeds where the soils are rich in organic matter in order to increase the amount of "moving phosphorus." The phospho-bacterin is used especially on the "virgin lands" in Siberia and northern Kazakhstan. The "virgin soils" are mostly Chestnuts and Chernozems rich in organic matter.

We are back to the hotel for lunch and then go out about 2:30 to the Dokuchaiev Institute of Soil Science, the highest authority on soil science in the Soviet Union.

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K-2503. July 21, 1958. Moscow. Some of our hosts at the Lenin Agricultural Academy.

K-2503

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I-7

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Here I meet Professor I. V. Tyurin, Professor Victor Kovda, and others of the Institute. I am glad to see that their building is being enlarged and remodeled so they will have more nearly appropriate space.

In the discussion of soil maps it is made clear that detailed soil maps are made by the ministries of agriculture in the republics under the general observation of the Union Ministry of Agriculture and according to the principles developed by the Dokuchaiev Institute of the Academy.

This Institute now has 150 soil scientists in its different branches and 150 other technicians. Formerly the Institute was grouped with geology and geography but since 1950 it has been grouped with the biological section of the main academy (The Academy of Sciences of the USSR). Professor Gerassimov, who is now head of the Geographic Section of the Academy, was formerly a member of the Dokuchaiev Institute.

The Institute has as its purpose the study of the soils of the USSR, to make small-scale maps, to improve soil productivity, and to protect soils from erosion and blowing. The Institute has the following sections:

1. Geography and cartography, under Professor A. Erokhina. Unhappily she is away on an expedition far to the east just now. There are about 25 soil scientists in this section and 25 other people, including those in a small chemical laboratory and one for mechanical analyses.

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2. Laboratory of soil genesis and the amelioration of saline soils, headed by Professor Victor Victor Kovda, who is also head of the Department of Pedology at the University of Moscow. This section has 32 persons.

3. An agro-chemistry section headed by Professor A. Sokolov. This section devotes attention mainly to soil fertility, improvements in the use of minerals, including lime. There are 18 persons.

4. Laboratory for soil mineralogy, headed by Professor N. Gorbunov. This has 17 persons.

5. Laboratory for biochemistry and microbiology in soils, headed by Dr. Kononova. This has 15 persons.

6. A section on soil physics and technology, headed by Professor N. A. Kachinski, who also holds a chair at the University in soil physics. This has 15 persons.

7. Laboratory for physical chemistry for soil, headed by Antipov-Karataev. (When I was here before he was assistant director and I am told that he is now in the field overseeing shelterbelt work east of Stalingrad!) This section has 12 persons.

8. Laboratory for chemistry of soils, including soil acidity and soil micro-chemistry, headed by Professor Basil Chernov. This has 12 persons.

9. Laboratory for soil hydrology, headed by Professor A. A. Rode. (This man always seems to be away on a field trip!) I am told that he is the author recently of a monograph on soil moisture that received a special award by the Academy. This section has 15 persons.

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10. Laboratory for the study of soil erosion, headed by Professor S. S. Sobolev. The purpose of this laboratory is to develop methods for the control of erosion, to indicate the distribution of soil erosion, and to help in developing principles for mapping eroded soils. This has 15 persons.

11. Laboratory for the study of methods of detailed soil mapping. This is headed by Professor V. A. Liverovsky. This is a new section only two-and-a-half-years-old. This section has 12 persons.

12. Soil Biology, headed by Professor Tyurin. They are now studying nitrogen balance in soils. This section has 12 persons.

Professor Tyurin outlines the several series of publications released by the Institute, in addition to Pedology (Pochvovedenie), which is edited here:

1. General soil maps are issued for all the Soviet Union and for different parts of it.

2. They have issued about 50 volumes of "transactions," each of which is developed by one section of the Institute.

3. They issue monographs on special subjects.

4. They issue monographs on methods for studying soils. (They even have one on the occurrence of oil deposits in relation to soil cover.)

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I am shown a detailed soil map of a farm. My time permits me to copy only a part of the legend, which is as follows:

1. Chernozem, leached, heavy loam.
2. Chernozem, weakly podzolized, heavy loam.
3. Chernozem, medium podzolized, heavy loam.
4. Chernozem, medium podzolized, with deposition of heavy loam.
5. Chernozem, gleyed, weakly podzolized, heavy loam.

I present Professor Tyurin with an example of our new detailed soil maps - the Ontario-Yates survey in New York. He gives Dr. Cline and me some soil maps, but not the very latest ones.

I visit the laboratory of Mr. Sokolov and he explains to us his work with "tagged" plant nutrients. He says that plants can extract nutrients from very saline soils at 16 atmospheres if part of the roots are in other pure water of say one atmosphere. If the upper layer is dry and not salty few nutrients are extracted. He has been working with P^{32} and Ca^{44} mainly.

We then go in to tea, with much wine, caviar, candy, and mighty little tea. We exchange gifts of books and maps. Altogether the session is very pleasant.

We are back at the hotel at 6:05 and have a very slow dinner.

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At 7:30 we are escorted to the Bolshoi Filial - a small theatre associated with the Bolshoi, which is normally dark in summer - to see The girl without a dowry. As usual, the ballet is very good indeed. The audience, which includes several Americans, is very appreciative.

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July 22

I had a poor sleep last night from too big a day yesterday I suppose.

After a slow breakfast we pay for our tickets from Intourist - \$300 for airplanes and \$360 for 24 days of rooms and meals. I exchange \$50 at the bank for 500 rubles.

At 10:20 a.m. we are in the cars to visit the Timiryazev Agricultural Academy. Now there is a lot of traffic, about like Washington except for a higher percentage of trucks. Moscow now has very nice buses, some with electric motors and some with gasoline motors. We reach the Academy at 10:45.

We meet the director, G. M. Loza, and he and his staff tell us about the institution. Except for those graduating from universities, this is the highest agricultural institution in the USSR for agronomy, agricultural engineering, and the like. (Degrees in soil science, botany, and other subjects fundamental to agriculture are given only in the universities.) They have courses in general agronomy and in several special lines, such as, seeds, plant diseases, soil-agronomy, agro-chemistry, horticulture, animal husbandry, and agronomy-economics.

They have more than 3,500 students besides post graduates who hope to become teachers and professors. Many students come only in the winter months for the higher degrees, when enrollment reaches 4,000.

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This Academy is under the Ministry of Agriculture. They have here a land area of 1,750 acres with sections for agronomy, animal breeding, horse stables (studs), a dairy farm, a poultry plant, a piggery, and experimental forestry. Much of the forest was planted over 100 years ago. Then too, they have horticulture, dendrology, entomology, and phytopathology.

Besides the establishment here there are six large farms belonging to the Academy having a total of 14,000 hectares. These are operated like state farms. Three are in the Moskovskaya Oblast. One is in Yaroslav on the border between Podzol and Chernozem; one is in the Volga region on Chestnut soils; and one is on leached Chernozem. These farms include experimental plots and students have a tour of duty in at least one of them. In this way they combine experimental work with education.

The course for a diploma runs five years. Graduates are called "scientific agronomist with diploma." About 70 percent of the studies are in the laboratories and classrooms and 30 percent in practical and experimental work on farms.

Besides the 500 scientific workers in the Academy, including professors and experienced research workers, there are 500 technical assistants on the staff.

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We are told that many of the students in soil science and agronomy go into various government services. Many trained in agro-chemistry go to the big farms where fertilizers are important.

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The Academy publishes scientific papers and an Academy magazine. Then twice each year they have a technical conference. All these reports are published in short form in a "Doklady." Each paper is limited to 8 typed pages. More detailed reports, up to 25 typed pages, are published in the magazine. Most of the Doklady are exchanged and are rarely available in the bookshops.

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They have made a special report on the soil problems of the "new lands." More than 12,500,000 acres were studied in Kazakhstan in order to help plan farms. They say that 90,000,000 acres of virgin soil have now been developed.

At the conclusion of this discussion, each of us is presented with the badge of a graduate of this Academy to be worn on the left side.

We are taken to the extensive soil museum and shown both virgin and cultivated profiles of the principal kinds of soil. I note several of these but cannot hope to get them all.

Tundra

Sod Podzol. This is a strong Podzol.

Soils from rocks rich in carbonate, including Rendzina, Sod carbonate, and Sod carbonate Podzol.

Alluvial soils

Peat soils

Many soils of the steppe and forest zone. The Gray-Forest soil here looks like a light-colored Chernozem. Their dark Gray-Forest soil I should have called a Chernozem: the surface layer is a bit gray and suggests a slightly degraded Chernozem.

They have a large collection of Chernozems including the following:

Leached Chernozem

Podzolic Chernozem

Meadow Chernozem

Thick Chernozem, A horizon more than one meter.

Ordinary Chernozem, good A_1 but less than one meter.

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Podsolic Chernozem

Meadow Chernozem

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Ordinary Chernozem, good A₁ but less than one meter.

Southern Chernozem. This is a little grayer than I expected.

Chernozem with Solonetz and Soloth.

The Gray-Forest soil is apparently more compact in the B horizon than in any of the Chernozem profiles.

Chestnut soils. (Dark, medium, and light.) This light Chestnut we should call a Brown soil.

Sierozem. This seems to include the brownish soils of the dry shrubby forest.

Cinnamon-colored soil of dry forest and shrubs on the border of the moderate and the sub-tropical climates. The soil is said to be calcareous in Bulgaria. In the United States it should perhaps be regarded as a calcareous variant of the old non-calcic Brown soils.

They next show us an exhibit of the farm where Dokuchaiev established the first shelterbelts. (K-2504)

We then go to the office of the Chief of the Soils-Agronomy Section. The late Professor Williams worked in this office and its laboratories for 55 years. They tell us about rotations on the Sod Podzol. This rotation, beginning with mixed clover and timothy, is outlined as follows:

1. Black fallow. Manure is added in the fall of black fallow and nitrogen, phosphorus, and potassium in the spring of the second year.

2. Winter wheat sown with perennial grasses, mainly clover and timothy.

Southern Chernozem. This is a little grayer than I expected.

Chernozem with Solonchaks and Solonch.

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the Sod Podzol. This rotation, beginning with mixed clover and

timothy, is outlined as follows:

1. Black fallow. Manure is added in the fall of black

fallow and nitrogen, phosphorus, and potassium in the spring of

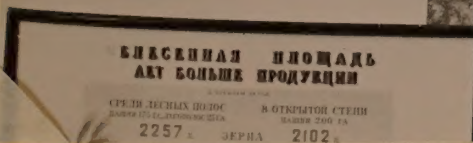
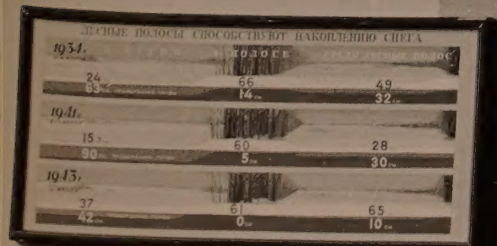
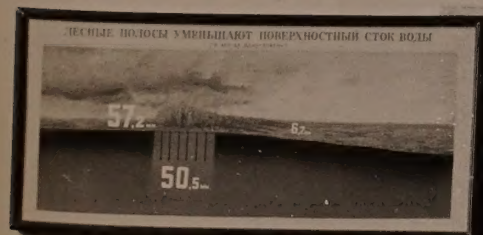
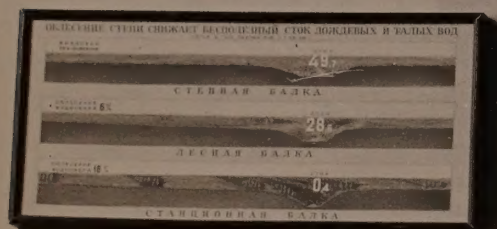
the second year.

2. Winter wheat sown with perennial grasses, mainly clover

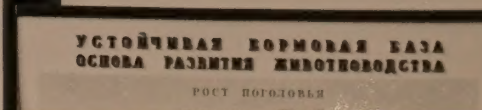
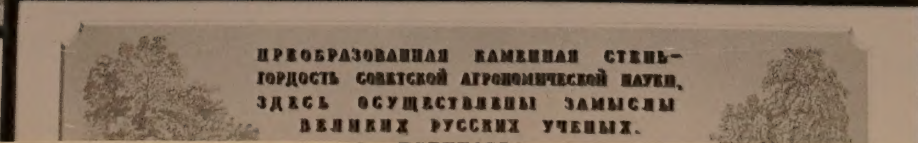
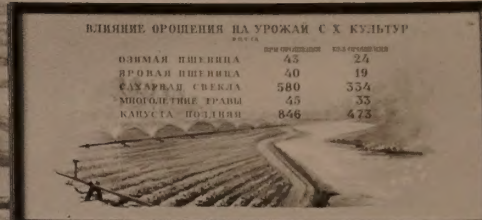
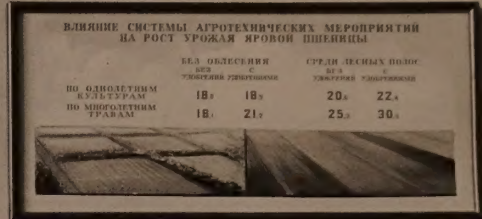
and timothy.

ИНСТИТУТ ЗЕМЛЕДЕЛИЯ ЦЕНТРАЛЬНО-ЧЕРНОЗЕМНОЙ ПОЛОСЫ, ИМЕНИ В. В. ДОКУЧАЕВА

НОЧЕВНЫЙ ПОКРОВ:
ПРЕОБЛАДАЮТ ОБЫКНОВЕННЫЕ
ТЯЖЕЛОУГЛУБИННЫЕ ЧЕРНОЗЕМЫ



ГОДОВЫЕ ОСАДКИ 438 мм
СРЕДНЕГОДОВАЯ t° 5.2°
ПЕРИОД ВЕГЕТАЦИИ 180 дн



X-5204.

3. Perennial grasses.
4. Perennial grasses and plow.
5. Spring wheat.
6. Potatoes. Potatoes get fertilizer and farm manure.
7. Barley or corn. Corn is fertilized in rows and used for silage.
8. Oats.

I ask about the use of lupines as a green manure in rotation with potatoes on sandy Podzols. They say the results are only fair.

Since the upper layer of soil is most rich in nutrients, they have tried plowing to about 45 or 50 centimeters in order to mix A₁, A₂, and B₂. Results have been fairly good with yields of winter wheat up to 4 tons per hectare.

We then go to the office formerly occupied by Professor Priianishnikov. This section does mostly teaching but has some research, especially on the problems of nitrogen-plant relations.

They now recommend fine grinding of raw rock phosphate without chemical treatment. This is used on podzolic soils and on leached Chernozem but not ordinary Chernozem. 80,000,000 hectares (I take this to be cropland) are suitable for using raw rock phosphate. Actually 1,000,000 tons were applied; but they claim not to know on what total area.

This section also works with soil micro-nutrients, lime, compost, and herbicides. They are continuing the work started by Professor Priianishnikov on the perennial lupine (Lupino polyfilis) for soil improvement, which he explained to me in Moscow in 1945.

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In this laboratory radio-active isotopes are used in research.

As usual we are in a big rush. As we leave with our books and medals at 1:30, the Director presents me with a bouquet of roses. (Although the other places had pictures of Krushchev, I saw none here but several of Stalin).

We are back to the hotel for a late lunch and leave for the University of Moscow at 3:15 p.m. We are met by Professor Victor Kovda, Professor Vilensky, and several others of the staff. The Department of Pedology (Soil Science) here occupies fine new quarters. Although the first course in soil science at the University was given in 1806, the first full course of lectures began in 1890. The first chair of soil science was officially established in 1921. Now there are six chairs in the Department of Soil Science.

1. General soil science. Professor Kovda. This section has 40 persons in it.

2. Geography and cartography. This section of 10 persons is headed by Professor Vilensky.

3. Soil physics. In charge is Professor Kachinski with 15 persons.

4. Soil biology. Professor Krasinilkov with 10 persons.

5. Agro-chemistry. Professor Avdonin with 12 people.

6. Agronomy with

The Department of Soil Science is one of four in the Biological Faculty of the University. The others are anthropology, zoology, and botany.

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The Department of Soil Science is one of four in the Biological

Faculty of the University. The others are anthropology, zoology,

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Besides excellent classrooms, museums, and laboratories for research and teaching they have experimental fields about 40 miles away and a forest biology station 70 miles from Moscow.

Annually they graduate from 40 to 50 students in soil science being trained mainly for research. Here they are expected to develop skilled scientists ready to go ahead with research. (This contrasts with the students of an institute who are not expected to do scientific research although some may develop along that line later.)

Students have basic science for the first two years and then theoretical soil science. Following that they are distributed among the six chairs according to the need for various skills. Between the second and third year they have their first field practice project. After the second year each student needs to have at least one experimental project. During the fourth and fifth years students have some elective courses given partly by outstanding soil scientists outside the University. Guests have come from Poland, Bulgaria, England, and China as well as the USSR. During the fifth year each student must do a considerable scientific thesis. The most talented of these are accepted immediately as aspirants for an advanced degree. They now have five of these and three foreign students.

Professor Kovda outlines some of their current lines of investigation:

1. Increasing the fertility of the acid soils of the non-Chernozem types;
2. Biological-mineral cycles;

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Chernozem types;

2. Biological-mineral cycles;

3. Soil aeration;
4. Methods for determining trace elements;
5. Biotoxins, especially in acid soils; and
6. Expeditions into virgin lands, cooperative with the Ministry of Agriculture.

Each April they have an annual meeting of the University. Each chair is obliged to select the best investigation of those of the students and professors to be presented. Four volumes of these are published by the University annually. In addition the Department of Soil Science publishes longer works. Short papers for important conferences are published in advance. Also monographs are published and the best work of the advanced students. Kovda praises highly the third edition (1950) of Vilenky's textbook on soils. The author gives me a copy.

I take a rapid tour of the classrooms and laboratories. They have several very nice research rooms for two graduate students. I see excellent examples of the most up-to-date equipment for all phases of soil research and for teaching. I insist that Professor Kovda must be a personal friend of the Minister of Finance. Unhappily we lack time to visit the main soil museum near the very top of the central tower of the University. Still here near the classrooms they also have very nice exhibits of soil monoliths and accompanying vegetation, and even animals, along with soil maps. (K-2513, K-2514, K-2516) I have never seen a research and teaching institute for soil science anywhere that is so well equipped.

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K-2513. July 22, 1958. Moscow. At University of Moscow. Soil map of a collective farm.

135-1
JUL 25 1954
U.S. DEPT. OF AGRICULTURE
WASHINGTON, D.C.
OFFICE OF THE SECRETARY
DIVISION OF CATTLE AND HORSE RAISING
BOSTON, MASS.
RECEIVED
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RECEIVED

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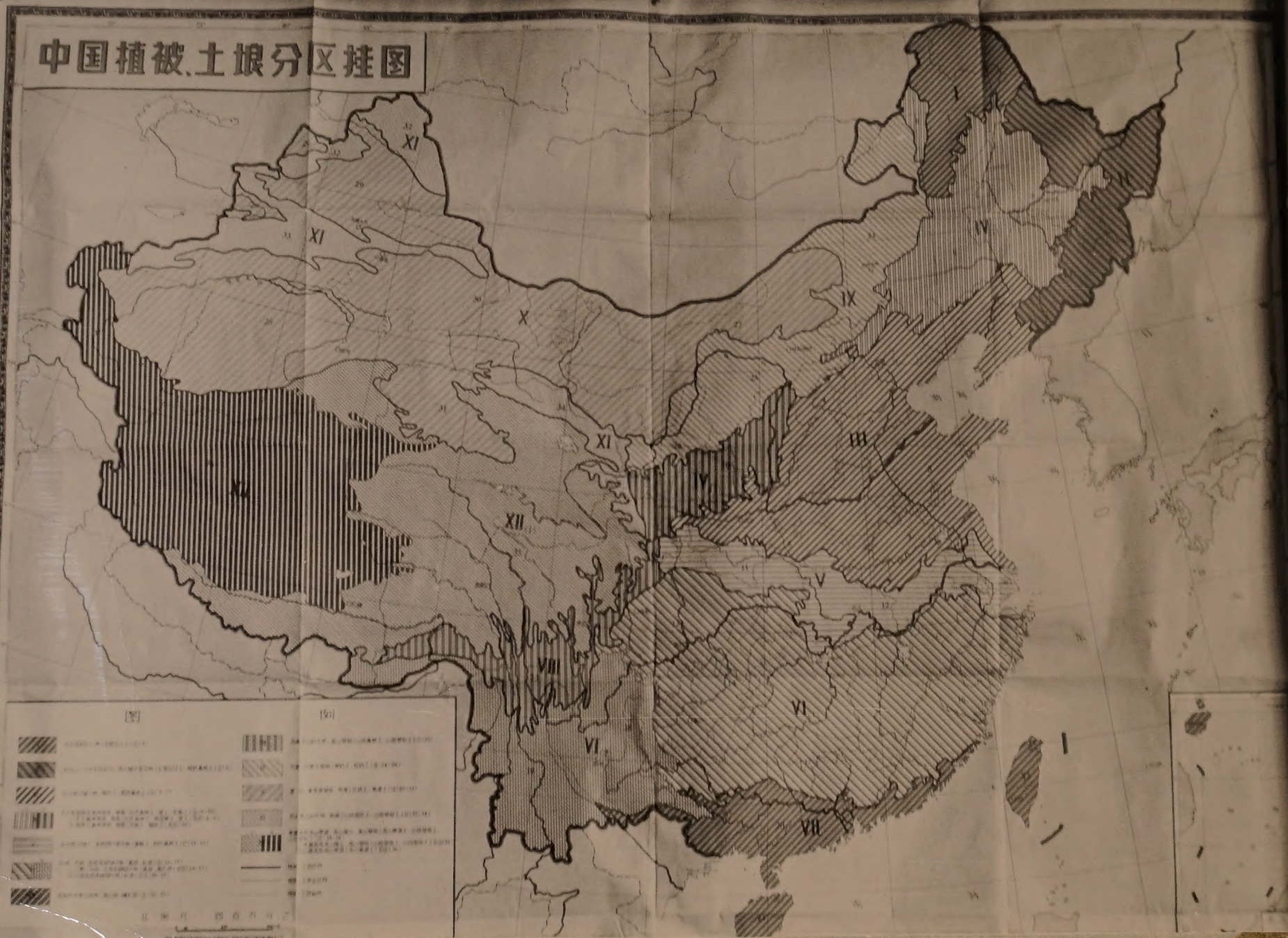


K-2514. July 22, 1958. Moscow. Soil monoliths for class work. Note vegetation and animals.

K-2514. July 25, 1955. Lebanon. Soil profile for site
near. low vegetation and animals.

ПОЧВЕННО-РАСТИТЕЛЬНАЯ КАРТА КИТАЯ

中国植被土壤分区挂图



21

111

111

Professor Kovda invites Mr. Bulik and me to his apartment for dinner. As soon as we get back to the hotel we have our tickets from Intourist. These mystify me a bit.

I prepare myself in a hurry as Professor Kovda and his wife are coming for us at 8:00. We need to wait for them. They come late at 8:25 and Kovda says that their apartment is not prepared to receive us! He says, "So we can have a pleasant dinner in the hotel." Obviously something changed his mind about having us come to his home. We do have a pleasant dinner while the others go to a puppet show. Kovda asks me to give a lecture in the University when I return from the field trip. We talk of the exchanges of persons and I stress workers and farmers as well as scientists. He expresses some irritation because he couldn't travel freely in California last year. I explain rather forcibly, what I am sure he already knows, that it was wholly because the Soviet Government would not at that time allow American engineers and scientists to visit freely in the Soviet Union.

Today we had given Professor Kovda many books and a modern tensiometer. He was obviously very pleased. This evening I give Mrs. Kovda a pair of nylon stockings. They both plan to go to China soon.

He asks me about the possibility of soil scientists from Red China coming to the Congress of the International Society of Soil Science in Madison, Wisconsin in 1960. I tell him that I doubt that this will be possible but I do not know. He is to write me an official letter of inquiry.

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Again late to bed.

(Added later: When I returned from my field trip on schedule there was neither call nor note from Professor Kovda so I did not lecture at the University.)

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After breakfast we meet the people from the Ministry of Agriculture and our passports are returned to us with proper visas. Bulik and I take the extra materials to the Embassy. He remains there while the rest of us go to the Institute of Fertilizers and Agro-chemistry; which comes under the Lenin Academy of Agricultural Sciences. Our hosts include:

1. Professor Frantsesson, V. A. - Vice Director of the Scientific Section. He is also Director of the Laboratory of the Chernozem Soils.
2. Academician Kedrov-Eikhman, O. K. - Director of the Laboratory for Liming Acid Soils and Isotopes.
3. Professor Karpinskii, N. P. - Director of the Laboratory of Non-Chernozem Soils.

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4. Professor Balyabo, N. K. - Director of the Laboratory of Desert-Steppe and Irrigated Soils.
5. Candidate of Agricultural Sciences Mamchenkov, I. P. - Director of the Laboratory of Organic Fertilizers.
6. Rodionov, Ya. E. - Scientific Secretary of the Institute.

We meet in the office of the Vice-Director and he tells us about their facilities and work program.

1. One soil laboratory studies the problems of fertility of podzolic soils. Methods are developed for making agro-chemical maps. The work involves the associated marshy soils as well as mineral soils. They show us large maps of state and collective farms as examples. They make the agro-chemical maps only to develop principles. Local organizations carry on most of the work.

2. Laboratory studies of Chernozem soils. During the last few years special attention has been given to the virgin soils of the new lands in respect to fertility and changes in fertility and other qualities with cultivation. They are attempting to develop methods for better use and cultivation of these soils in northern Kazakhstan and western Siberia. We are told here that 35.5 million hectares were reclaimed from 1954 to 1956. They hope to find a basis for better tillage methods. Soil structure is being studied but they have not tackled the problem of fertilizer use. Studies are carried out by expeditions into these areas.

3. A laboratory for the soils of dry steppes and deserts studies methods of amelioration of Solonetz, such as with gypsum but mainly with special plowing. The depth of this special plowing varies in accordance with the amount of gypsum to be worked into the surface

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soil. Here they are talking mainly about reclamation for dry farming although spots can be irrigated. This laboratory also is concerned with the fertility of irrigated soils under cotton in Middle Asia.

4. A laboratory on methods for agro-chemical analyses seeks quick methods for use in local areas.

5. In a special laboratory for soil tillage they study changes in the different layers of plowed soils, "to prove scientifically methods of tillage." This laboratory is some 60 km. from Moscow. Other experimental farms are far from Moscow.

6. There is a laboratory for systems of fertilizer use and crop rotations with a network of experiments at some 100 stations under the Ministry of Agriculture and the guidance of this Institute, which plans the work and interprets the results. These results are used for making recommendations to the government about fertilizers for industrial crops. The Vice-Director gives me a book summarizing these recommendations. Twice each year a general session is held for discussing the results of the work.

7. A mineral fertilizer laboratory studies new forms of mineral fertilizers manufactured by industry. Several promising ones include melted deflorinated apatite, liquid ammonia, and new forms of urea. Metaphosphate was found to be good but is not yet manufactured in the USSR.

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9. In a laboratory on soil liming they study leaching in acid podzolic soils and seek to find the proper amounts of lime to apply and methods of application. They deal also with theoretical problems of forms of soil acidity and effects on plants. This laboratory deals also with the micro-nutrients, especially cobalt, magnesium, manganese, and boron. They have some sulphur deficiency in clover on podzolic soils, but since they use superphosphate the plants get enough sulphur. (This is inconsistent with recommendations for raw rock phosphate on podzolic soils.) We are told that finely ground apatite is not used but that large amounts of rock phosphate are used. They emphasize that biometrical analyses of the experiments are made and that the number of replications depends on the complexity of the soils.

10. A laboratory on organic fertilizers studies methods of preparing manure, making different composts, and using green manures.

11. A laboratory on radioactive isotopes is studying plant nutrition with radioactive cobalt, calcium, phosphorus, zinc, strontium, molybdenum, and boron. Other laboratories in the Institute work with sulphur.

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12. A micro-biological laboratory studies the role of micro-organisms in plant nutrition and includes experiments under sterile conditions.

13. The Institute includes a Department of Economics to study relative costs and returns.

14. There is a laboratory for chemical weed control.

The Institute has an experimental station near Moscow and one for sandy soils in the Bryansk region, which is mainly for studying green manuring. Close relations are maintained with the stations of the Lenin Academy and with the Ministry. At this center there are about 200 on the professional staff. We are given several recent books that may well be worth translating.

We then take a rapid tour of some of the laboratories.

The fixation of phosphorus in soils and its uptake by plants is similar to the work carried out by Dr. Lyman Dean of the United States. Methods of using ion-exchange resins are something like those of Dr. C. A. Black of Iowa. They emphasize the quantity versus the intensity factor. Their use of the term "phosphate level" is similar to Dr. Scofield's "phosphate potential." They use a photo-electric colorimeter for tracing phosphorus. They now have a new method for measuring concentrations of phosphorus in water and salt solutions as low as .01 milligrams per litre. They evaporate under infra-red lamps. Organic phosphate is determined by oxidation with hydrogen peroxide.

12. A micro-biological laboratory studies the role of

micro-organisms in plant nutrition and includes experiments

under sterile conditions.

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Experiments are carried out in the field and greenhouses with different crops and soils.

We are shown maps of a collective farm in the Moskovskaya Oblast made in 1950. Recommendations from this work are now said to be in practice. The farm has 67,000 acres, of which 45,000 are plowed.

(a) Basic soil map showing:

1. Sod Podzol with heavy clay loam on:

- i. Third terraces
- ii. Second terraces
- iii. First terraces

2. Ancient alluvial soil - Sod Podzol that was gleyed and is now drained.

3. Sandy Sod Podzol on first terrace from alluvium.

(The Sod Podzols are subdivided into phases for slight erosion and for temporary excess wetness.)

(The main soil types on this farm are apparently at the level of our soil series.)

(b) Map of rotations, now said to be in practice. Field boundaries follow the main lines on the soil map. It appears that the drains for wet soils are mainly open ditches at 100 to 200 meters.

(c) Map of pH of plowed soil. (pH of salt extraction in 1N KCl).

This map corresponds only partly with the soil map because of differences in former use. If the recommendations have been followed most of the map is out of date.

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(d) Map of available phosphorus using unbuffered .2N HCl for extraction. They do not use buffers for podzolic soils. The location of the individual plots and livestock barns are clearly obvious.

(e) We see another soil map of phases according to available phosphorus.

We are told that all collective farms in the Moskovskaya Oblast have these large-scale maps. Now they are doing the state farms. We are told that these are made at no cost to the farms.

Sometimes they make maps of available potassium; but not of nitrogen, except to tackle a problem of micro-nutrients. They have some cobalt deficiency among cattle. They have deficiencies of molybdenum but only a few cases of excess.

Analyses are made here only for demonstration purposes. Each oblast has its own laboratory and I gather that some rayons do also.

They tell us that they are studying the mixing of ground rock phosphate with acid peat and manure to make compost in which the phosphate is more available to plants. Mono-valent cation humates make the ground rock phosphate more soluble. At least three months is required on collective farms for making this compost of peat and manure. Formerly it was not turned but now they have special machines for the purpose. They did not find the artificial manure made from straw, nitrogen, and phosphorus of economic benefit. Only the most advanced collective farms use good compost. Where much peat is used, KCl is added to the compost, partly to help control denitrification.

(d) Map of available phosphorus using unpublished, 1:250,000 scale

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Sawdust is used for litter in stables and thus in compost. It is used as a mulch for strawberries and some other crops along with mineral fertilizers.

They have alkaloid-free lupines that are cut for silage just before flowering. The second growth is plowed down in the autumn.

On some farms clover is sown after the spring cereal. The next year after the cereal harvest, the clover is taken in June and the soil is plowed and sown to a winter crop.

As with us, now that more chemical nitrogen is used, yields are higher and there is a heavier stubble to plow down.

As low as one milligram of certain humates per one kilogram of soil produces considerable growth. So does the application of liquid ammonia to peat compost.

The laboratory for isotopes started in 1951 with radioactive cobalt, calcium, phosphorus, and sulphur. Now the main emphasis is on strontium 90. They are studying its effects on both seeds and vegetation.

It is too bad we have so little time. At 1:30 we leave for the Embassy and then the hotel. We have a slow lunch which includes the final settlement of our food bill.

We finish packing and go down for tea. The cars come and we leave the hotel at 5:50 p.m. At 6:30 we weigh in at the airport and are soon called to board our plane. The wheels leave the ground for Minsk at 7:41 p.m.

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At first the land is undulating to gently rolling. Perhaps one-third of the cover is forest with small trees. The rest is mainly small grain, hay, pasture, and fallow. I see several small streams, ponds, and wet swampy places.

Houses in the villages are spread out so that each has a considerable plot, perhaps one to two acres. Other houses are fairly close together along the road with longish narrow strips back of them.

The air is hazy. Out 10 minutes I see some rather large areas of forest. Much of the soil is wettish.

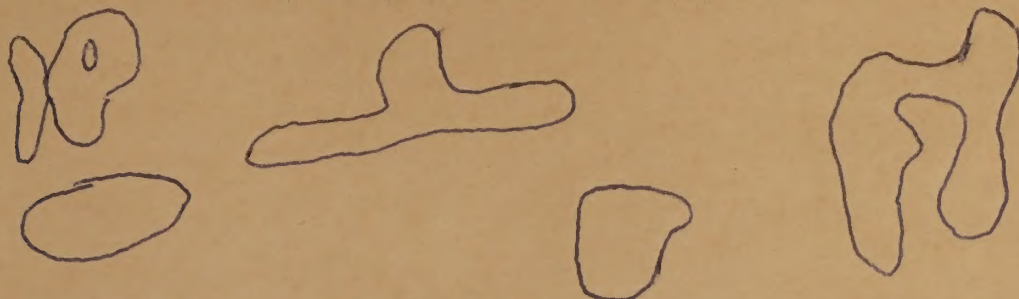
I see a curious installation having several small, low, solid buildings with large concrete roads leading to them. It is hard to follow the map. I see heavy forest, then areas with about one-third forest, and some more heavy forest of small trees. There is much soil here that could be improved by drainage.

At 8:13 the plane goes up to 1,900 meters and I can hardly see more than the general pattern of land use.

I note a curious variety of awkwardly shaped fields, near and within the forest. Then too, farm work goes around tiny elliptical objects in some fields. (War relicts?) Already I have seen a variety of village patterns and various sizes of home allotments. Around some of the villages there is a very complicated pattern of winding roads.

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Twilight comes and it is hard to see except for more of these curiously shaped fields of 3 to 20 acres.



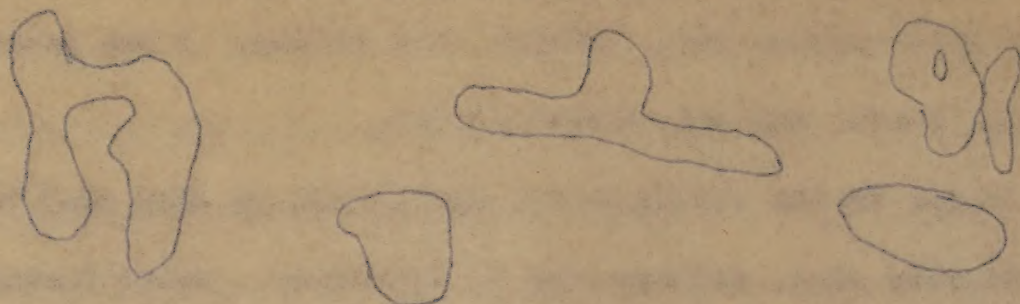
Near Smolensk there is somewhat more cropland but also considerable forest. At 9:00 we pass the rail line south of Vitebsk. Here about one-half is cultivated and I see more of these curious fields. Yet the local plots of members of the collective farms are rectangular strips with square corners.

About 20 miles from Minsk the cover is about one-half forest and more normally shaped fields. I see a few lakes.

We are down at Minsk at 10:10. We are met by Professor Lupinovich, President of the Academy of Agricultural Sciences for Belorussia. He is a soil scientist highly recommended by Professor Kovda. He and other members of the delegation first take us on a brief tour of the city. I am far too tired to appreciate this. Finally we are taken to our hotel - the Belorussia. Then we have a slow dinner and one day passes to another as we finish.

Twilight comes and it is hard to see except for more of

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July 24

It rains this morning. Although this is a new hotel, it is not very well appointed. Curiously, the shower is directly over the wash basin. Most of this city is new except for the main government building of the Belorussian Republic. The Germans had placed 17 tons of explosives in it but for some reason the charge failed to explode. Nearly all the other buildings were completely destroyed and have been replaced.

We go to the Ministry of Agriculture with the president of the Academy of Agricultural Sciences and others. He points out that not only was the city destroyed but also nearly all the farm buildings. Some of those made immediately after the war were temporary and need replacement.

The Minister, Mikhail Nikolaevich Lutsenko, says that he thinks we shall learn very much during our trip and that his staff has learned a good deal from earlier delegations. He says that he is eager for mutual exchanges of ideas and that these can only be helpful to both countries.

We discuss our plans for the stay in Minsk including drainage research and visits to collective farms. Most time will be spent at the Amelioration Institute. The director is Stepan Gordeevich Skoropanov.

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We are told that agriculture is the most important branch of economy in the Belorussian Republic. It has never been considered an important grain-producing area. Now cattle breeding, pig production, dairying, and fiber flax are most important. We are told that the income of the collective farms is now roughly one-third from fiber flax. Also, hemp is grown on a large scale in marshy areas. Potatoes for human food and for animal feed is the leading crop in the Republic, about 1 million hectares. The farmers know well how to grow potatoes. Average yields are about 10 tons per hectare, but the best farms get 18 to 20 tons. With them sugarbeets is a relatively new crop. They are trying to increase the acreage and are building some new beet-sugar factories.

Their plans call for bringing an additional 1.5 million hectares of marshy land in Polesseye Oblast of Belorussia into use through drainage. Most of this is peat on which they expect to grow sugarbeets, hemp, flax, and especially animal feed. They claim to get 40 tons of sugarbeets on peat soils some 120 to 150 centimeters deep. They also grow vegetables for city use and some green corn for silage.

A large part of the potato crop is used for alcohol. Now some state farms have factories for making alcohol.

They emphasize that on new land they can make collective farms of optimum size. (I do not get a clear idea of what this size is.) Part of the new land is allotted to state farms and part to collective farms.

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Much of this undrained land has been used for pasture and following reclamation the collective farms simply expand their total business. A few years ago 95 percent of the cropland belonged to the collectives; now the figure is 89 percent. I ask how the land gets transferred from the collective farms to state farms. The reply is not entirely clear. It is said that many collective farms have great areas of marshy lands and could not develop all the area despite the fact that the government pays 50 percent of the cost. Thus, it is said, that the collective farms themselves apply to the government to take the extra land for state farms. (If I know farm people at all, this takes some outside urging!)

The Republic has 3,912 collective farms and 144 state farms. I am told that the size of the collective farms varies widely. Of course, in Siberia and in northern Kazakhstan farms have several thousand hectares, but here the optimum size falls between 1,800 and 2,500 hectares with 180 to 200 families per farm. It is said that on good soils the family plots vary from .2 to .3 hectares. If these lands are wet they are drained for the families as a part of the drainage scheme. The large canals are built entirely at the expense of the government. The auxiliary canals and the tile drainage are paid for one-half by the government and one-half by the farms, except that the wealthy farms are expected to pay all the cost of the tile drainage. The government also pays one-half the cost of topographic surveys, stump removal, and land leveling.

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The crops on the family plots are mainly potatoes, vegetables, orchard fruits, and some fodder for animals. One family commonly has its own pig and cow. Those near the city sell some of their vegetables in the city free or farmers' market.

The income of the collective farmer depends upon the number of work days. He is paid partly in kind, including some animal feed, and partly in cash. As a rule, most farms have a common pasture for the individual cows apart from other pastures.

I try to get some idea of the income of a family on a collective farm. Of course the standard work day is a rather theoretical concept. The number received for one 8-hour shift depends on the skill required for this job. The least skilful workers on a farm get 75 percent of a labor-day unit for an 8-hour shift while the most skilful workers get 3 units for one 8-hour shift. I am told that the head of a family would have around 320 to 350 work days and that other members of the family might have around 170 to 180 all together. Thus it is said that one farm family might have 500 to 550 work-day units annually. On the average, one work-day unit might be worth 7 rubles in cash plus 1.5 kilos of grain, 3 kilos of potatoes, 200 to 250 grams of hay, and some vegetables.

On the Dawning Collective Farm with 1,200 families and 7,000 hectares, the farm itself received 18 million rubles. This is an outstanding farm and paid 25 rubles for each labor day plus about 2 kilos of grain and other materials accordingly. By converting all this to cash the income amounts to about 1,000 rubles per month per family.

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A collective farmer pays a small tax for his plot and house, which is said to amount to about 3 to 5 percent of his income.

The Minister discusses the sending of Soviet farm people to the United States. He says that he wants them to have an opportunity to work on American farms.

At 10:35 we go to the Belorussian Scientific Research Institute of Amelioration and Water Utilization. Director S. Skoropanov, tells us about its history and work. The Institute arose from an expansion and extension of an older Minsk institute for swamp reclamation.

The Institute studies the marshy lands of which there are about 7 million hectares or about one-third of the land in the Republic. They study the different kinds of soil and especially how to drain the wet soils. Part of the drainage is done by the engineers from the Institute. They also recognize the problem of developing theoretical methods for the drainage and management of the marshy lands.

The Institute is divided into a total of 13 sections for handling various aspects of this big problem. They have sections on soils, amelioration, agronomy, and so on. The professional staff here is about 150 of whom 45 percent are engineers. At the moment they are short of space and many of the laboratories are in the other buildings. In two years they expect to have a large new building.

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Besides laboratories, they have experimental fields, including a large experimental station near Minsk. That farm is already too small. They have another station near Kosovskaya about 250 kilometers from Minsk. There they have 650 hectares under drainage experiments. A third station and center is being made in the Polesekya Valley. They will have 8,000 hectares of nearly level land for this station. Reclamation by drainage is just being started. They plan to carry out large-scale drainage at this place, which is some 300 kilometers from Minsk.

We take a quick look at the laboratories. They begin with the soil map. There are lowlands in the south of the Republic, old marine deposits in the central part, and marshy land in the north. The area was said to have been glaciated 3 times but the last one covered only the northern part. The highest areas have a covering of loess. Rainfall is highest in the northwest, about 500 to 600 millimeters; and it drops down to 450 millimeters in the south. The absolute minimum temperature at Minsk is about -37° centigrade.

Originally the cover was forest and marshy moors. The northern part had fir trees and mixed forest. There is some fir near Minsk, but not in the south. The sandy soils of the north have pine and spruce but there are more deciduous trees in the south. Much land now remains in forest, especially in the southern part of the Republic.

I attempt to copy down the scheme for soil classification; but this is so time consuming that they give me a copy for insertion in my notes.

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SCHEME OF SOIL CLASSIFICATION AND CONVENTIONAL SYMBOLS

FOR LARGE SCALE MAPPING					
No.	Conventional Symbol	Type	Subtype	Kind	Form
	Colours and Signs	According to soil formation process and structure	According to degree to which basic processes of soil formation are expressed	According to mechanical structure of soil parent	According to soil forming parent
					According to character of transformation of soil under the influence of natural processes
		I. SODDY	A. Leached	1. On clays 2. On loams 3. On loamy light sand 4. On sands.	Underlain with lime, chalk, loam and peat tuff. (noted in description or by additional symbols.)
		II. SODDY PODSOL	1. Slightly podsol 2. Medium podsol 3. Strongly podsol	On clays: a) pulverized b) sandy	
		"	1. Slightly podsol 2. Medium podsol 3. Strongly podsol	(In all cases stony structure is described by additional symbols).	
	"		1. Slightly podsol 2. Medium podsol 3. Strongly podsol	On loam: a) pulverized b) sandy	
	"		1. Slightly and medium podsol 2. Strongly podsol	On loamy light sand: a) pulverized b) sandy	
	"		1. Slightly and medium podsol 2. Strongly podsol	On sand: a) pulverized b) medium and small grain types.	Thick, underlain by sand, moraine loam, lake clay etc. (see additional symbols)
	III SODDY PODSOL BOGGY SOILS		1. With traces of temporary bogging 2. With gley spots (gleyey) 3. With gley horizon (gley) 4. With eluvial-humus horizon A. Podsol and soddy-podsol B. Humus	Shown in colours accepted for soddy-podsol soils: a) on clays b) on loams c) loamy light sand c) sands.	Virgin soils (under forest) (abandoned, cultivated (slightly, medium, heavily) lime fertilized. Reclaimed. (Degree of cultivation with the exception of vegetable gardens are shown in the diagram).
IV	IV SODDY BOG SOILS		1. With traces of temporary bogging 2. With gley spots (gleyey) 3. With gley horizon (gley) Shown by the same symbols as podsol bog soils on soddy soil background (see I-1,2,3,4) 4A. Humus-gleyey 4B. Humus-gley Carbonate (shown by additional symbol)	Shown by the same colours as soddy soils: a) on clays b) on loams c) on loamy light sand d) on sands	
V	V. PEAT-BOG SOILS 1. (lowlands) 2. (transition) 3. (highlands)		A. Peatygley Thickness of peat to 50 cm. B. Peat gley (thickness of peat to 1 m.) C. Peat more than 1 m. (Thin: up to 2 m.; medium: up to 3 m.; thick: over 3 m.) Thickness of peat is shown by figure on the contour).	On grass-sedge, sedge, horse-tails, reed, alder, sphagnum, etc. peats. (Noted in description or by additional symbols accepted in bog science).	
VI	VI. FLOOD LANDS (Alluvial) SODDY		a) Leached b) Podsol The symbols for III and IV - 2, 3, are the same as for gleyey and gley, i.e. by a blue interrupted or uninterrupted line. Carbonates (described by an additional symbol a).	1. On alluvial clay 2. On alluvial loam 3. On alluvial loamy light sand. 4. On sands	
VII	VII. FLOOD LANDS (Alluvial) BOGGY		1. Silt-bog carbonates (Shown by additional symbols) and leached (can be described in the same way as a) and b). 2. a) Peat-boggy- thickness of peat up to 30 cm. b) Peat bog - thickness of peat up to 1 m. c) Peat - thickness of peat more 1 meter.	a) On alluvial clay b) On alluvial loam c) On alluvial loamy light sands d) On sand. On grass-sedge, sedge, reed, horse-tail, alder and other peats are marked as for peat bog soils. See V - 1, 2, 3.	

ADDITIONAL SYMBOLS

Additional symbols show: underlain with moraine, underlain by lake clay, underlain by sand, boulders and stones on the surface of the soil, eroded soils, shifting sands, deposits of minerals, deposits of vivianite in peats, deposits of ochre and iron ore, carbonates.

They show me some dark-brown peat with grass peat to about 2 meters. They maintain that a fluctuating ground water brings minerals to the surface in this peat. They show me samples of high moor with sphagnum peat from the north-central part of the Republic. They say that about 11 or 12 percent of the 7 million hectares of peat are of this type, which runs about 14 meters thick. They say that the building-up process in the center is not much more than one meter. Of course such peats are not reclaimed but are used for fuel.

It is said that each oblast has an institute including a department for soil science and agro-chemistry to investigate each collective farm under the general guidance of this Institute. Soil maps of farms are made on a scale of 1:10,000.

Starting with these basic soil maps and with laboratory tests, maps are made showing available phosphorus, calcium, potassium, humus, and pH. With these maps they work out a plan for drainage and other treatments of the fields, including crop rotations.

I am promised that I may have one of these soil maps. (Added later: One was given to the last of our men to leave and I shall try to send an example of one of ours to them.)

They study the genesis of the soils, their mineral and biological properties under natural conditions, and how these properties change with amelioration and fertilizer use. They have found out that many of the soils change very greatly with increased aeration. Biological activity is greatly stepped up along with the decomposition of the

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organic matter and the release of minerals. Then new processes appear. In organic soils with 15 percent mineral matter, nitrification is low in relation to ammonification. After drainage, nitrification goes on at full speed. The soil may have around 4 percent nitrogen but is commonly low in phosphorus, say 0.2 to 0.3 percent. Potassium may be as low as 0.01 percent.

In the physical chemical laboratory they work on the problem of absorption of phosphorus ions in peaty and clayey soils. They are also studying the content of micro-nutrients in Sod Podzols and peat soils. They are using radioactive phosphorus and they have concluded that the absorption of phosphorus ions by both peat and clay is mainly a surface phenomenon. Exchanges between the solution and the soil are mainly surface reactions.

The absorbed phosphorus ions are gradually converted with the aging of the drained soil. Aluminum is particularly important in the sod-podzolic surface layer, and iron is more important in the B horizon. They find that the amounts of the other ions, such as zinc, manganese, cobalt, and copper, depend a great deal on the parent material. They have widespread deficiencies of cobalt and copper in the peat soils.

We take a look in the laboratory for hydro-technical amelioration. The problems of this laboratory include:

- (1) Surveying and calculation of the drainage needs.
- (2) Methods of marshland reclamation, including:
 - a. Methods of calculating drainage systems;
 - b. Distance between tile lines;

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(2) Methods of marshland reclamation, including:

a. Methods of calculating drainage systems;

b. Distance between tile lines;

- c. Norms of swamp drainage;
- d. Intensity of evaporation in swamps;
- e. The depth of water to remove from peat; and
- f. Coefficient of infiltration.

They show us how they calculate the water levels in the rivers in order to plan their drainage so that the maximum deliveries of water will not exceed what the streams can take care of. These maxima and minima for drainage are essential to proper design in relation to existing streams.

They emphasize the importance of early sowing on their reclaimed marshy soils. Generally they say that if grain sowing is late, the yields are reduced 100 kilograms per hectare for each day that it is late. For this reason the plan must take into account water delivery and removal in relation to time of sowing. Unhappily, this delivery time is sometimes when streams are in flood. They found that this delivery rate at sowing time could be calculated when the sum of the daily average temperatures is 130° centigrade. This excess of heat over zero centigrade begins as soon as the snow is melted, or from 0°C if there is not much snow. Separate equations for these factors are developed for each river.

They have investigated the norms of swamp drainage on already drained areas and for those about to be drained. These results show clearly that the yield of water increases with depth to the water table and then sharply falls at greater depths. They found the optimum norms for the water table to be about 60 to 70 centimeters for grass and about 80 to 100 centimeters for potatoes. (These seem

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for grass and about 80 to 100 centimeters for potatoes. (These seem

somewhat great to me and must be related to rather wide spacing.) They insist that deep drainage is satisfactory in wet peat about 80 to 100 centimeters deep over sand. In such situations they have taken the water table down to as low as 5 meters. (Offhand, this seems much too deep to me.)

I raise a question about the danger of soil blowing but they claim that they rarely have droughts and that these soils hold water well. Occasionally they have provided for adding water in drought periods to the drainage canals but this has not proved useful in many places.

They show us some large charts giving their equations for calculating distances between drains. (K-2517, -18, -19) These are said to be included in recent textbooks.

They study the physical and mechanical properties of soils and changes occurring in the river beds. Here they study the movement of water by the use of radioactive elements. We are shown a portable survey meter for field use. This makes use of sulphur, rubidium, or chlorine isotopes. We are also shown the laboratory counters used for samples taken from the fields. (Although our time is short they seem to be willing to show us everything, including things that might have been supposed to be classified.)

Now we go downstairs to look at the hydraulic laboratory where they are studying the permissible speed of water in the canals. They say that they have proved that the non-erosive velocities can be

6

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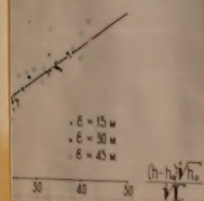
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ФОРМУЛА
ВОДЫ К ДРЕНАМ

$$\frac{h(h-h_0)\sqrt{h_0}}{\sqrt{L}}$$



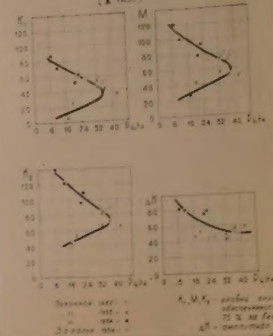
РАСЧЕТ РАССТОЯНИЙ МЕЖДУ ДРЕНАМИ

$$E = \sqrt[4]{\frac{1}{h_0} \left[\frac{25\psi K T \omega (2t-H-u-2h_0)}{\delta \pi (H-u) + 4(N-V)} \right]^3}$$

$$E = 4 \sqrt{\frac{2KTh_0}{\pi \delta \ln \frac{(t-u-h_0)(t-H+h_0)}{(t-u+h_0)(t-H-h_0)}}}$$

ЗАВИСИМОСТЬ УР
ОТ УРОВНЕЙ Г

ЛЮГОВЫЕ ТРАВЫ



K-2517. July 24, 1958. Minsk. Formulae for calculating distance between drains at Amelioration Institute.

ИССЛЕДОВАНИЕ ВОДОУДАЧИ ТОРФА

1. КОЭФФИЦИЕНТЫ ВОДОУДАЧИ ТОРФА В ЛАБОРАТОРИИ

2. ЗАВИСИМОСТЬ МЕЖДУ ВОДОУДАЧЕЙ И КОЭФФИЦИЕНТОМ ФИЛЬТРАЦИИ ТОРФА

3. РАСЧЕТНАЯ ФОРМУЛА ВОДОУДАЧИ ТОРФА

$$\delta = 8.2 \sqrt[3]{K^2 \sqrt{H}}$$

ИЗУЧЕНИЕ ИСПАРЕНИЯ С БОЛОТ

1. КОЭФФИЦИЕНТЫ И УСТАНОВКА ИСПАРИТЕЛЕЙ

2. ЗАВИСИМОСТЬ ИСПАРЕНИЯ С БОЛОТ ОТ ГЛУБИНЫ ГРЯНТОВЫХ ВОД, КЛИМАТИЧЕСКИХ ФАКТОРОВ И УРОЖАЙНОСТИ СЪЕЗДОВ

$$V = \frac{\alpha D (1 + 0.1 W)}{e^{nH}}$$

$$V_t = V_n + 1.5 \sqrt{P \Sigma D}$$

$$K_t = \frac{1.5 \sqrt{\Sigma D}}{V P}$$

ИССЛЕДОВАНИЕ КРИВЫХ ДЕПРЕССИИ ГРЯНТОВЫХ ВОД

$$y-h_0 = \frac{(h-h_0)(1-P)^m x}{L P^{2m} + (1-2P^m)x}$$

РАСЧЕТНЫЕ ФОРМУЛЫ ПОСЛЕ

$$q = \frac{11.5}{K L (1-P)} [2h_0 (1-P)^m]$$

$$q = \frac{5 \delta \sqrt{h_0}}{L \sqrt{1-P}}$$

$$q = \frac{5 \delta \sqrt{h_0}}{L \sqrt{1-P}}$$

$$\delta = \sqrt{\beta + \lambda}$$

$$q = \frac{\delta \sqrt{h_0}}{L \sqrt{1-P}}$$

K-2518. July 24, 1958. Minsk. Formulae for calculating distance between drains at Amelioration Institute. (Another view.)

K-2517

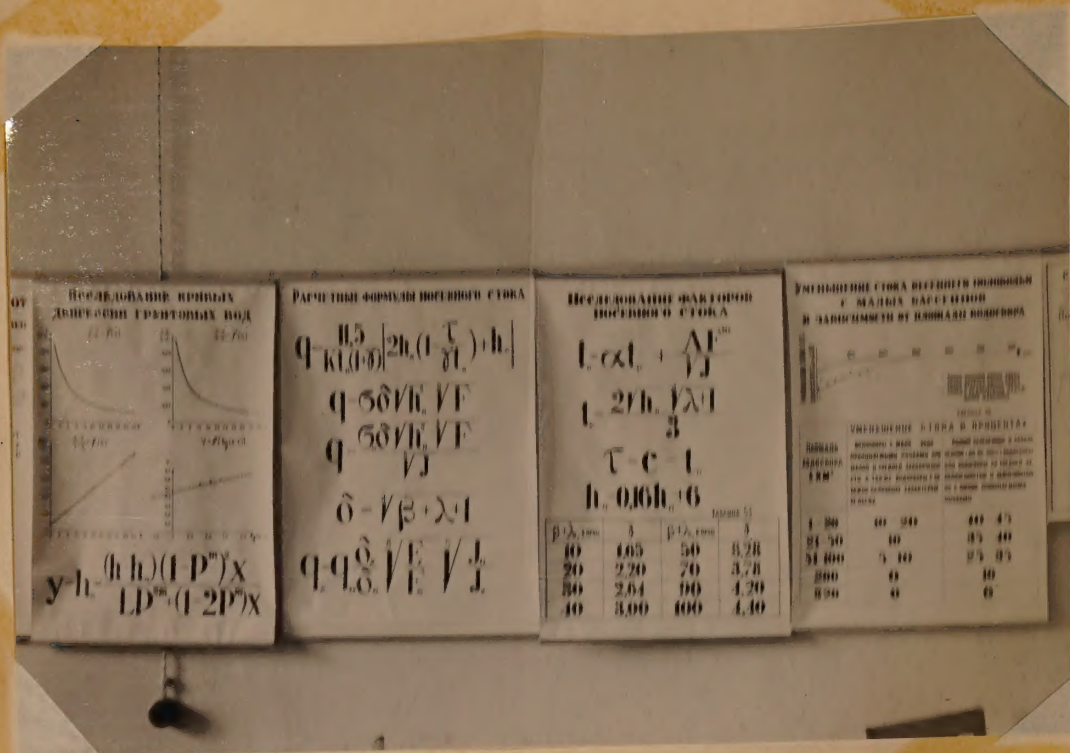
III-5

K-2517. July 24, 1958. Minsk. Formula for
calculating distance between drains
at Amelioration Institute.

K-2518

III-6

K-2518. July 24, 1958. Minsk. Formula for
calculating distance between drains at
Amelioration Institute. (Another view.)



K-2519. July 24, 1958. Minsk. Formulae for calculating distance between drains at Amelioration Institute.



K-2520. July 24, 1958. Minsk. Amelioration Institute: hydro-technical laboratory.

III 7

K-2519

K-2519. July 24, 1958. Minsk. Formulas for calculating distance between drains at Amelioration Institute.

K-2520

III - 8

K-2520. July 24, 1958. Minsk. Amelioration Institute: hydro-technical laboratory.

somewhat higher than those normally published. They do not determine the velocity of water by the sizes of the particles carried but by using samples of the particles suspended in the water. While we watch, the velocity of the water increases in a large adjustable canal with a sand bed. Of course, as the water increases in velocity the particles start to move. Other laboratories study other phases of water movement in canals. (K2520).

In an adjacent laboratory they are studying the friction of peat soils, compression of peat, and changes in its permeability to water. They claim that all these characteristics must be known for proper designs of canal beds, slopes of the canals, and the stability of roads and other structures.

Certainly these men here know how to get money for soil research. This year they have a 30 percent increase in their budget, all of which comes from the government of Belorussia.

At 1:30 p.m. we return to the hotel for a very slow lunch, and then leave for the experimental station near Minsk of this Institute on amelioration at 3:00 p.m. We arrive at 3:15.

First we are taken to see the lysimeters filled with peat where they are studying the effects of different depths of the water table and other active practices on potatoes, corn, and other crops. (K-2522) Their studies indicate that a depth of 80 to 100 centimeters is nearly ideal for their crops. For grasses, wheat, and fiber flax they maintain the water table at 70 to 90 centimeters. At this

62

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installation they also check the temperature every day, the water extracted by plants for all vegetable production, and finally the effect of the water table on yield and quality of crops.

The work in the lysimeters looks good to me, but that on water balance in pots does not seem well controlled. We are taken in to see moisture studies where plants in pots are on little cars that can be shifted from the greenhouse to out-of-doors and back again. They claim that they check the water here daily but I don't see how the measurements can be very exact.

They have a lot of pots in a wire cage where they are studying the fertilizer needs for crops. We are told that azotobacter helps on peat soils and may increase yields as much as 100 percent assuming proper fertilization with copper, potash, and phosphorus. But I can not see this difference from azotobacter alone; but I can see a big effect of nitrogen fertilizers. Then we are told the effects of azotobacter show up only on the grain during the ripening period. (But I certainly don't believe they get anything like 100 percent) Their experiments demonstrate the need for phosphorus and potassium on the newly drained peat soils. They tell us that oats respond to nitrogen only in pots, not in the field. This seems curious.

On the basis of their experiments they recommend 60 kg of P_2O_5 per hectare for cereals. I notice that some of the corn and oats in these experimental pots is quite diseased. They show dramatic effects of fertilizer on oats and hemp. They are trying to push fiber flax. But it is not yet grown on a large scale. Copper has

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on peat soils and may increase yields as much as 100 percent assuming
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Their experiments demonstrate the need for phosphorus and potassium
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fiber flax. But it is not yet grown on a large scale. Copper has



K-2522. July 24, 1958. Minsk. Experimental Station of Amelioration Institute. View of lysimeters with potatoes in peat soil.



K-2521. July 24, 1958. Minsk. Experimental Station of Amelioration Institute. General view of pot work.

K-2522

IV-

K-2522. July 24, 1958. Minsk. Experimental
Station of Amelioration Institute.
View of lysimeters with potatoes in peat
soil.

K-2521

IV-1

K-2521. July 24, 1958. Minsk. Experimental
Station of Amelioration Institute.
General view of pot work.

a big effect on flax and they recommend 2 kilograms of pure copper per hectare, or 1/2 ton of an impure copper byproduct mixed with the phosphorus and potassium. The corn shows a good residual effect of recent copper treatments. We are told that no other trace element gives any great response.

I see that the soils here are very good peat soils and comparable to our Carlisle muck of the Lake States.

We are taken for a light lunch in the garden. I am amazed at the nice cherries grown here on these peat soils.

It is a bit difficult to understand clearly the crop rotation system partly because land devoted to perennial grass is not called "cropland" even though perennial grasses are a regular part of the cycle. They say that they use mainly a 9-year rotation as follows:

1. Perennial grasses
2. Cabbage and potatoes
3. Winter rye
4. Perennial grasses
5. Perennial grasses
6. Perennial grasses
7. Sugarbeets or other row crops
8. Spring cereals
9. Hemp or sugarbeets.

As I understand this rotation they would have say 4 fields, one of which would be under perennial grasses. Often after the grasses they have winter rye followed by rye and a row crop, then cereals, then hemp, and finally another row crop.

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3. Winter rye
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K-2523. July 24, 1958. Minsk. Experimental Station of Amelioration Institute. One of the main drains in peat soil, much like our Carlisle.



K-2524. July 24, 1958. Minsk. Experimental Station of Amelioration Institute. First year of meadow after drainage of peat soil (Bulik).

- 2523

IV-3

K-2523. July 24, 1958. Minsk. Experimental
Station of Amelioration Institute.
One of the main grains in peat soil,
much like our Carlsale.

- 2524

IV-4

K-2524. July 24, 1958. Minsk. Experimental
Station of Amelioration Institute.
First year of meadow after drainage
of peat soil (Bulik).



K-2525. July 24, 1958. Minsk. Diagram of experimental farm of Amelioration Institute.

K-2525. July 24, 1958. Minsk. Diagram of experimental
farm of Amelioration Institute.

IK-3

23

We walk over a cabbage field where drainage was begun in 1911. (K-2523) They tell me that here they started with rather wide ditch spacing and found that 100 meters was a proper spacing. This seems a bit wide to me. Then in 1925 they started with closed drains: clay tile, wooden tile, and French tile. By 1941 they had found that the open drains had the same effect on yields as the closed drains. Thus only the main drains are open on this place now.

They have fields of 10 hectares that are not crossed by any canal or closed drain. They gave me the following yields:

Cereals, 3 to 4 tons per hectare

Potatoes, 30 to 50 tons per hectare

Grass (as dried hay), 10 to 15 tons per hectare

Green corn fodder, 50 to 60 tons per hectare

Carrots, up to 100 tons per hectare

Hemp, 1 to 1½ tons of fiber per hectare.

In 40 years the subsidence has been about 1 percent per year, from about 1 meter thickness of peat, to 60 centimeters. They estimate that each year about 6 tons per hectare of the organic matter is decomposed and mineralized. But crop residues replace 2.5 to 3 tons per hectare giving an annual loss of about 3 tons.

They emphasize that this soil is not used for fuel, only the high moor peat; but this good peat is often used in compost.

We are shown some plots for studying afforestation on the drained soil so that collectives may have some timber trees.

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Cereals, 3 to 4 tons per hectare
Potatoes, 30 to 50 tons per hectare
Grass (as dried hay), 10 to 15 tons per hectare
Green corn fodder, 50 to 60 tons per hectare
Carrots, up to 100 tons per hectare
Hemp, 1 to 1½ tons of fiber per hectare.

In 40 years the subsidence has been about 1 percent per year, from about 1 meter thickness of peat, to 50 centimeters. They estimate that each year about 6 tons per hectare of the organic matter is decomposed and mineralized. But crop residues replace 2.5 to 3 tons per hectare giving an annual loss of about 3 tons. They emphasize that this soil is not used for fuel, only the high moor peat; but this good peat is often used in compost. We are shown some plots for studying afforestation on the drained soil so that collectives may have some timber trees.

They use a mechanical excavator to clean the drains and keep the slopes planted with perennial grasses.

For a meadow crop here they use clover, timothy, and annual French ryegrass. The following year there is no ryegrass. The yields appear to be good and I see few weeds (K-2524).

They have a series of plots for studying cereals that can be grown without lodging. This requires a combination of soil science and plant breeding. Here on the peat soil they must select lodging-proof varieties as well as ones resistant to brown rust, yellow rust, and mildew. Also the growing season is short and they try to have crops with short straw.

Because of the high nitrogen from the decomposition of the organic matter, with high moisture they get lodging and disease. Additional potassium helps a little, but not very much.

They start sowing cereals in the spring when the peat soil has melted to about 12 or 15 centimeters. All the cultivation is done in autumn.

I look at a profile of this peat soil. The color of the turfy surface soil is black about (5YR 2/1). The whole soil is said to be about 180 centimeters deep. I notice a black silty layer at 60 centimeters which is said to be 12,500 years old as determined by pollen analyses.

We see some nice sugarbeets that they claim will yield 4.5 to 5 tons of sugar per hectare. They tell us that they are now using mono-germ sugarbeet seed. I look at the soil here and find that it is 94 centimeters to coarse, compact sand and fine gravel. The sandy layer that

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crops with short straw.

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Additional potassium helps a little, but not very much.

They start sowing cereals in the spring when the best soil has

melted to about 12 or 15 centimeters. All the cultivation is done

in autumn.

I look at a profile of this best soil. The color of the turf

surface soil is black about (2YR 2/1). The whole soil is said to

be about 180 centimeters deep. I notice a black silty layer at

60 centimeters which is said to be 12,500 years old as determined by

pollen analyses.

We see some nice sugarbeets that they claim will yield 4.5 to

5 tons of sugar per hectare. They tell us that they are now using mono-

sugarbeet seed. I look at the soil here and find that it is 90 cent-

imeters to coarse, compact sand and fine gravel. The sandy layer that

was at 60 centimeters in the virgin profile is at 30 centimeters here after long cultivation. This suggests a loss of perhaps 30 centimeters of peat in the 38 years since the field was drained.

We have some discussion about overdrainage. It seems to me that the drains are too far apart and that near the drains there is some excess drainage. They maintain that when rainfall is normal yields of sugarbeets, potatoes, and cereals are best in the "overdrained" areas. During drought years yields of the same crops are similar in both normally drained and overdrained areas. Yet the yields of perennial grasses are reduced by 10 to 15 percent with overdrainage. It is claimed that the quality of crops is higher in the overdrained fields with more starch in the potatoes and more sugar in the sugarbeets. I ask about soil blowing but they insist that this hazard is avoided by having perennial grasses in the rotation. I am told further that after some drainage and cultivation the drains can be deepened.

I see one section of this overdrained soil like Carlisle muck that would blow badly in many parts of the United States. Here there are 90 centimeters of the organic soil over coarse compact sand. Water moves up from this layer partly by capillary action but I suppose mainly by vapor movements. Of course the soil decomposes rather fast under these conditions, but the water-holding capacity is quite good and plants are said to endure drought well. I note that the roots of perennial grasses go down almost to the sand layer. In a nearby well it is 359 centimeters to the water table.

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We are taken to see a large field having a collection of 234 varieties of corn. This year has been too cool for good results. Most varieties are less than a meter high and some hardly more than 25 centimeters.

We go to another lunch with toasts and writing in the guest book.

On the way back to the hotel we stop to look at the hemp. We return at 8:30 p.m. and have another very slow dinner. I am now ready for bed at 11:00.

This is a remarkable city with nice buildings, shops, parks, and the like, when one recalls that most of it was destroyed during World War II.

We are taken to see a large field having a collection of

134 varieties of corn. This year has been too cool for good

results. Most varieties are less than a meter high and some

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World War II.

July 25

When we get up the sky is overcast and suggests rain. Opposite our hotel is a special place where pigeons are fed and where water for them is provided.

We leave Minsk for visits in the country at 9:15 a.m. I see a few women working with men at hard labor repairing the streets; but fewer than I saw in 1945.

We go east from the city on a gently undulating to rolling ground moraine. The material is rather sandy on the hills. Some of the hills have been eroded. The cover is mostly pine.

In the suburbs I see a few of the old style wooden houses. This is a moderately good black-top road with plantings of trees and shrubs along the side. The trees are mostly white birch and aspen. The hilly land suggests Coloma and sandy Bellefontaine. The C slopes are in scrubby woodland. Grain crops on the upper B slopes are thin. We come into a large area of nearly flat land with Bog soils, some recently drained. In general, the landscape suggests north-central Wisconsin.

At 10:00 we come to a reclamation area said to be part of the Volma reclamation scheme. The plan is to develop 25,000 hectares of peat soil. They started two years ago and have 7,000 hectares finished. The station has bulldozers, ditch diggers, and other machines. Each station is said to have 20 different types of machines. Each of these reclamation stations does about 7 to 11 million rubles worth of work

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K-2526. July 25, 1958. Near Minsk. Volma reclamation area; making 3d order ditches.



K-2527. July 25, 1958. Near Minsk. In Volma reclamation area. Tile-laying machine with caterpillar tractor. (The tile are laid by hand on boards and the joints covered with moss).

K-2526

IV-

K-2526. July 25, 1958. Near Minsk. Volma
reclamation area; making 3d order
ditches.

K-2527

IV-7

K-2527. July 25, 1958. Near Minsk. In Volma
reclamation area. Tile-laying machine
with caterpillar tractor. (The tile
are laid by hand on boards and the
joints covered with moss).

annually. Here the main drains are already in and they are now making mostly third-order drains for which they use chain-type bucket excavators of one-fourth cubic meters and other machines. As soon as the area is partly drained they add closed drains of clay tile.

The peat here is roughly two meters deep over stratified sand which appears to be partly outwash and partly lacustrine in origin. The sand is mostly coarse but there are silt and fine sand strata. Further along the ditch I see silty gley under the peat. The pH of the surface soil runs between 5 and 7.

There are a lot of machines here and I suspect they are put to work especially for demonstration to us. Obviously some are being tested.

I see one back-hoe excavator making third-order ditches to 130 cm. (K-2526) After the water is out clay tile will be lain. This work costs 3,000 rubles per hectare.

I look at another much larger machine for digging trenches for laying tile. (K-2527; K-2641) Here the peat is somewhat less well decomposed than that seen yesterday. A rather poor quality of clay tile is being laid on boards at the bottom of the ditch about 140 cm. deep. I am told that the average depth for the line is 175 cm. People are laying this tile with water still in the ditch and sealing the joints with sphagnum moss. Many of the workers are women.

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K-2641. July 25, 1958. Near Minsk. Volma
drainage area. Tile-laying machine.

K-2641. July 25, 1958. Near Munich. Volume
discharge area. Tilt-laying machine.

(Added later: I suspect that this machine is a near copy of a Dutch machine.) So far as I can see the machine operates fine although I wonder whether this tile line is really a part of their program.

Here they clear off the vegetation, plow, sow a crop, and then smooth the surface.

I talk briefly with Mr. V. I. Zhukov, the chief engineer. He shows me some of the tile but they are not well burned.

I then go over to a huge V-shaped ditcher which is mounted on one tractor and given help by another caterpillar with a big winch. (K-2642) (In fact I have to ride on this for the Soviets to get official photos.) These ditches are 130-150 cm. deep and are called third-order open ditches. The side slopes are about 1:.75 to 1:1. I am told this machine can make 6 to 7 km. in one 8 hour shift. Spacing varies from 100 to 300 meters. I am told that the pulling resistance is 10 to 14 tons.

They demonstrate a similar machine of smaller size pulled by one tractor. The ditch is 80 to 100 cm. deep. (K-2643)

These machines look all right to me but I doubt that they would work in anything but peaty soils. Then they demonstrate a large machine to make mole drains. (K-2528) I am told they have a hydraulic system for controlling the grade level automatically. It is not entirely clear to me how this works but it has some kind of speed governor and Swedish level. But they admit that hand regulation is necessary on rough ground. The mole is 25 cm. in diameter and is

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K-2642. July 25, 1958. Near Minsk. Volma drainage area. Big ditching machine, self propelled, for depths of 130 to 150 cm.



K-2643. July 25, 1958. Near Minsk. Volma drainage area. Ditching machines for ditches 80 to 100 cm. deep pulled with one tractor.

K-2642. July 25, 1958. Near Minsk. Volma drainage
area. Big ditching machine, self propelled,
for depths of 130 to 150 cm.

K-2643. July 25, 1958. Near Minsk. Volma drainage
area. Ditching machines for depths 60 to
100 cm. Deep pulled with one tractor.



K-2528. July 25, 1958. Near Minsk. In Volma reclamation area. Machine for making mole drains. Hydraulic system used to control grade level.

K-2528

K-2528

K-2528. July 25, 1958. Near Minsk. In Volms reclamation
area. Machine for making mole drains. Hydraulic
system used to control grade level.

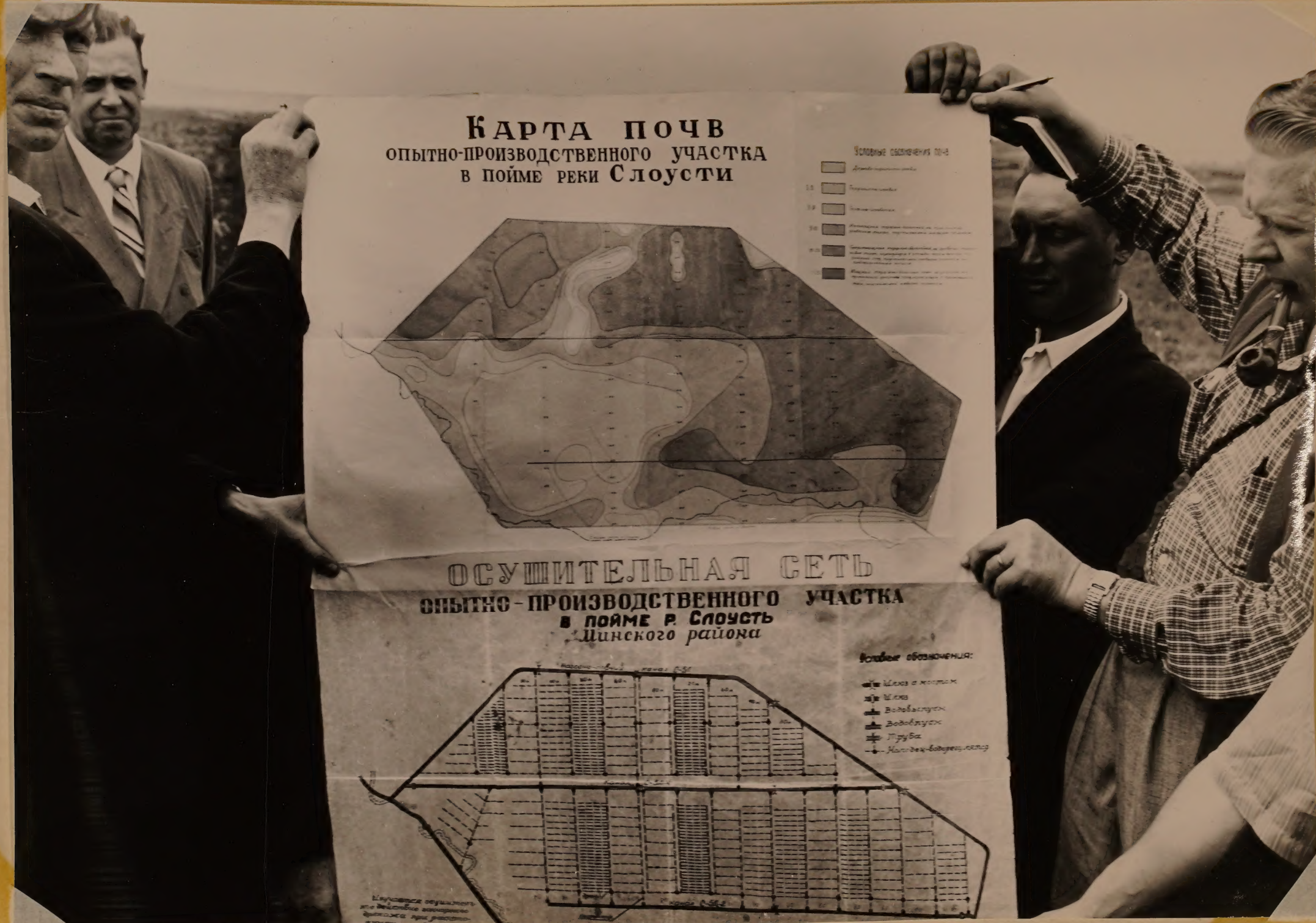
pulled at a depth between 60 and 140 cm. They are spaced some 10 to 30 meters apart. I am told that this is the cheapest method of drainage. It lasts about 3 to 5 years and must be repeated. The driver makes 8 to 10 km. in an 8 hour shift. (In Sod-Podzol they use moles of 10 to 15 cm. in diameter.)

The people here have certainly gone to a lot of trouble to show us these machines. I next go to an interesting one for cleaning the bottom of large ditches or for deepening them. (K-2644). This is pulled by a very large caterpillar tractor with a power take-off which operates a rapidly whirling bladed disk that throws the mud up on the side and over the edge of the ditch. On this large ditch I am told that the vertical grade is 0.00006 to 0.0001. The ditch slopes are about 1:1.75. It seems to me that I have seen a machine like this but I can't remember where. (Added later: I heard later that a machine like this had been in use in England for some time. I might have seen one in the fens near Cambridge.) On the whole this looks to me like a pretty good rig although very big.

Then we walk over to see some land clearing. They use a bulldozer with prongs something like those I have seen in Alaska but with shorter prongs and not so good for shaking the soil off the roots. Then they demonstrate a machine for cutting the brush. The cat pushes forward a hooded piece of steel like a snowplow with heavy side knives to overturn and uproot bushes, small trees, and coppices. The appropriate level is controlled by a hydraulic device and huge springs. We are

12

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КАРТА ПОЧВ ОПЫТНО-ПРОИЗВОДСТВЕННОГО УЧАСТКА В ПОЙМЕ РЕКИ СЛОУСТИ



- Условные обозначения почв**
- 0.0 Дрифт-песчаные почвы
 - 1.0 Песчаные почвы
 - 2.0 Супесчаные почвы
 - 3.0 Суглинистые почвы
 - 4.0 Глинистые почвы
 - 5.0 Торфяные почвы
 - 6.0 Торфяно-болотные почвы
 - 7.0 Болотные почвы
 - 8.0 Торфяно-болотные почвы
 - 9.0 Болотные почвы

ОСУШИТЕЛЬНАЯ СЕТЬ ОПЫТНО-ПРОИЗВОДСТВЕННОГО УЧАСТКА В ПОЙМЕ Р. СЛОУСТЬ Цинского района



- Условные обозначения:**
- Мехов с жерстью
 - Мехов
 - Водоболотник
 - Водоболотник
 - Труба
 - Мехово-водоболотник

K-2529. July 25, 1958. Near Minsk. On collective farm, Comintern. Soil map and drainage plan.

K-5253. JUL 52, 1928. NEW YORK. ON COLLECTIVE TRIP, COMING IN. 2011 NEW AND GLENNING BROS.

14-2524



K-2644. July 25, 1958. Near Minsk. Volma drainage area. Machine for cleaning and deepening large ditches.

K-264. July 25, 1958. Near Minsk. Volma
drainage area. Machine for cleaning
and deepening large ditches.

shown another type that can cut trees up to 20 cm. in diameter.

The cut bushes are allowed to stand for 10 to 15 days to dry.

But they do not burn them. They rake them into piles and let them rot for two years, then the tractors run over them and smooth the piles down.

As we walk to another area we pass a place where peat is being removed and dried for fuel, despite their statement yesterday that this good peat wasn't used for fuel. Then they demonstrate an enormous moldboard plow mounted on a tractor. A big roller is mounted in front to smash down any small brush. The furrow is about 50 cm. deep and 1 meter wide. It turns under low bushes and all. After plowing, the soil is disked and seeded.

I ask what is the first crop but am told that this is not the place to answer! I am told that this area we are visiting will be part of a collective farm to be called the Hero of Labor. We get in the cars and drive on and stop for a light lunch on an undulating area of Sod Podzol with a few glacial boulders. I see women of the collective farm going by with scythes. I see a herd of mixed dairy cows in only fair condition. As we drive on past this farm the buildings are rather poor and unpainted. Both rye and potatoes are rather poor.

We drive on to the Comintern Collective Farm. These country earth roads are very dusty when dry and very muddy when wet. As we drive along I see potatoes, flax, rye, some poor corn, and some good clover.

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We drive on to the Communist Collective Farm. These country earth roads are very dusty when dry and very muddy when wet. As we drive along I see potatoes, flax, rye, some poor corn, and some good clover.



K-2530. July 25, 1958. Near Minsk. Chairman
L. V. Chekalin of Comintern Collective
Farm in corn field.

K-2530

V-2

K-2530. July 25, 1958. Near Minsk. Chairman
L. V. Cherkashin of Communist Collective
Farm in corn field.

We drive onto an area of Bog soil reclaimed two years ago. We meet the chairman of this farm, L. V. Chekalin. He tells me that the average collective farm has 3,500 hectares, 311 families, and 580 workers.

The agronomist on this farm graduated in 1951 from the Belorussian Agricultural Academy with engineering training. Here they have 1,500 hectares of mineral soils under crop and 700 hectares of peat soils. They expect to reclaim 250 hectares more of the peat. Three hundred hectares of the reclaimed soil have clay-tile drains. We are shown a map of this drained area made by examining each 10 square meters.

The Institute has some experiments here with clay tile at spacings of 20, 30, 40, 50, and 60 meters in a regular pattern. (K-2529)

Their first crops were corn, potatoes, oats, and perennial grasses. According to the feeding stuff produced, potatoes made the best first crop. According to labor costs, perennial grasses made the best first crop and corn the second best.

I note that the material under the peat here is a silty very fine sand.

The corn is spotty and not good because of excess rain and low temperatures. They fertilize it with 120 kilos of K_2O and 70 kilos of P_2O_5 per hectare. This is broadcast with a seed drill and followed by a disk harrow. They also use 500 kilos per hectare of a copper-containing by-product which has 2.5 kilos of pure copper in it. This is said to be good for 5 or 6 years. They say that the soil contains 3.5 percent nitrogen on a dry basis. They have had no results from treating seeds with azotobacter.

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In the low places the perennial grass winter-killed. After a few crops the land will be smoothed.

We are also shown plots with various fertilizers for corn, barley, and millet.

The Institute is checking the water levels here. They use pipes 10 cm. in diameter for observation. To the bottom there is fastened a disk for giving it stability. The lower one meter has many holes. The lower part of this section is covered with a fine brass screen. Since the disk at the bottom is 28 cm. in diameter, they bore a hole 28 cm. deep and fill around it with gravel.

This is quite elaborate and expensive but should work. They check the water table every day. They can cultivate when the water table is at or below 40 cm.

We then see sugarbeets. These are given 150 kilos of K_2O and 90 kilos of P_2O_5 per hectare.

Now they talk about the first crop. They say that contrary to the general idea of vetch and oats or oats as the first crop, they recommend starting with a row crop such as potatoes, roots, or corn. They get more feeding stuff than from cereals and the surface soil is more rapidly decomposed.

Then we are taken to this collective farm headquarters for a heavy lunch - much food, vodka, etc., and many toasts and songs. Melnikov irritates me a bit with a toast that suggests that the Russian people have two attitudes, one toward the Government of the

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United States, which they don't like, and another toward the people of the United States, whom they do like. The chairman seems quite dictatorial toward his staff but he explains to me that he is not appointed by the Communist party, which makes me sure that he is. In his toast he supports "Peace and atomic isotopes only for agriculture."

We leave the farm at 5:00 p.m. with little opportunity to talk to any of the people. This sort of banquet is a bit tiresome. And most have had too much to drink.

As we drive on I see a great deal of potentially good land still to be reclaimed.

We stop at the Western Machine-Testing Station of the Ministry of Agriculture of the USSR. I am met by the director, Mr. Yakerson. Here tractors and other machines are tested for use in this Republic, both ordinary farm machines and those for reclamation and transport. I am shown several tractors. One has extremely large wheels with pneumatic tires to keep the soil pressure down to .2 kilo per square cm. I am shown one with a four-wheeled drive for which they claim 30 to 40 percent increase in pulling power. They also have a track-laying tractor from Stalingrad with very wide tracks for peat soil. I am shown moles made of wood, which are said to be cheaper and to have lower resistance than metal ones.

One combination machine has a fertilizer distributor, followed by a heavy roller, a cereal seeder, a grass seeder, and finally a small roller.

United States, which they don't like, and another toward the people of the United States, whom they do like. The chairman seems quite dictatorial toward his staff but he explains to me that he is not appointed by the Communist party, which makes me sure that he is. In his toast he supports "Peace and atomic isotopes only for agriculture."

We leave the farm at 3:00 p.m. with little opportunity to talk to any of the people. This sort of banquet is a bit tiresome. And most have had too much to drink. As we drive on I see a great deal of potentially good land still to be reclaimed.

We stop at the Western Machine-Testing Station of the Ministry of Agriculture of the USSR. I am met by the director, Mr. Yakerson. Here tractors and other machines are tested for use in this Republic, both ordinary farm machines and those for reclamation and transport. I am shown several tractors. One has extremely large wheels with pneumatic tires to keep the soil pressure down to 2 kilo per square cm. I am shown one with a four-wheeled drive for which they claim 30 to 40 percent increase in pulling power. They also have a track-laying tractor from Stalingrad with very wide tracks for poor soil. I am shown mowers made of wood, which are said to be cheaper and to have lower resistance than metal ones. One combination machine has a fertilizer distributor, followed by a heavy roller, a cereal seeder, a grass seeder, and finally a small roller.



K-2531. July 25, 1958. Near Minsk. Western Machine-testing Station. A machine for disking, scraping, and chains to cut turf (grass "nigger heads") of peat soil.



K-2532. July 25, 1958. Near Minsk. Western Machine-testing Station. The big plows for peat soils. (Nina M. Ryabova, teacher in the Academy of Agricultural Sciences at Minsk.)

K-2531

K-3

K-2531. July 25, 1958. Near Minsk. Western
Machine-testing Station. A machine
for disk, harrow, and chain to
cut turf (grass "niger heads") of
peat soil.

K-2532

K-4

K-2532. July 25, 1958. Near Minsk. Western
Machine-testing Station. The big plow
for peat soil. (Mina M. Rykova, teacher
in the Academy of Agricultural Sciences at
Minsk.)

I photograph a machine for disking and scraping, along with chains to cut the turf of marshland (K-2531). I also photograph one of the big plows used in marshland (K-2532).

Eddie is indisposed because of the heavy lunch and translation is a little difficult with Mrs. Ryabova.

I look at combines and threshers for flax and hemp. They have machines to pull flax, to thresh it, and to crush it between rollers. One large corn planter has six seed boxes. The potato planters and many other machines seem very heavy.

At 6:50 p.m. we start for the hotel. Some of the boys are a bit ill and sleepy. I overhear that our translator was fired for drinking too much.

In the evening I talk to Melnikov and Eddie and get things patched up so that he can continue on with us.

I feel that the time at the collective farm and the toasts were obviously staged. We wasted a lot of time that I should have liked to have used to go over the rest of the farm on the Sod Podzol. The crops of rye and potatoes look small and nitrogen deficient. Yields will be low. Perhaps the chairman is over emphasizing the peat soils to the neglect of the other fields.

And so to bed.

I photographed a machine for disk and scraping, along with chains to cut the turf of marshland (K-2231). I also photographed one of the big plows used in marshland (K-2232).

Eddie is indisposed because of the heavy lunch and translation

is a little difficult with Mrs. Ryabova.

I look at combines and threshers for flax and hemp. They have machines to pull flax, to thresh it, and to crush it between rollers. One large corn planter has six seed boxes. The potato planters and many other machines seem very heavy.

At 6:50 p.m. we start for the hotel. Some of the boys are a bit ill and sleepy. I overhear that our translator was fired for drinking too much.

In the evening I talk to Melnikov and Eddie and get things patched

up so that he can continue on with us.

I feel that the time at the collective farm and the forests were obviously staged. We wasted a lot of time that I should have liked to have used to go over the rest of the farm on the Red Podzol. The crops of rye and potatoes look small and nitrogen deficient. Yields will be low. Perhaps the chairman is over emphasizing the best soils to the neglect of the other fields.

And so to bed.

July 26

I slept well until about 5:15. The sun shines, the doves coo, and it promises to be a nice day. So I am up.

A little before 7:00 I go for a walk on the main street. Like Moscow, the streets are swept in the early morning and are very, very clean. There are many sweepers on the street, mostly women, who work with buckets and long brooms.

We have breakfast, pack, and settle our bills. We are in the cars at 9:15 to visit the collective farm, New Life, some 25 kilometers south of Minsk.

Despite all the rain I see a big tank truck going down the street watering the trees from a horizontal pipe. I should not think this necessary, but I suppose it is in somebody's plan. We pass over an undulating to gently rolling, fairly well dissected plateau, with loess over what looks like some marine materials. I don't know whether they have been glaciated or not, but I suspect so. The soil is said to be Sod Podzol under forest. Lime is needed for good crops. The pH of the natural soil is said to be 5.5. The road cuts suggest a moderate B horizon of slightly reddish-brown soil.

We cross the Ptich River. I see a few ponds but this soil area generally has well developed drainage. The road is fairly good black top with trees and shrubs along the margins.

July 26

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coo, and it promises to be a nice day. So I am up.

A little before 7:00 I go for a walk on the main street.

Like Moscow, the streets are swept in the early morning and are very, very clean. There are many sweepers on the street, mostly

women, who work with buckets and long brooms.

We have breakfast, pack, and settle our bills. We are in the

cars at 9:15 to visit the collective farm, New Life, some 15 kilo-

meters south of Minsk.

Despite all the rain I see a big tank truck going down the

street watering the trees from a horizontal pipe. I should not

think this necessary, but I suppose it is in somebody's plan. We

pass over an undulating to gently rolling, fairly well dissected

plateau, with loess over what looks like some marine materials.

I don't know whether they have been glaciated or not, but I suspect

so. The soil is said to be Sod Podzol under forest. Lime is needed

for good crops. The pH of the natural soil is said to be 5.5. The

road cuts suggest a moderate B horizon of slightly reddish-brown

soil.

We cross the Petch River. I see a few ponds but this soil

area generally has well developed drainage. The road is fairly good

black top with trees and shrubs along the margins.

I see a rather poor cabbage crop and only fair potatoes and rye. There are a few fruit trees. I see some poor lupines. We pass a field of barley that looks quite good and might run 25 bushels per acre. Pastures are good with both cattle and sheep. Yet certainly yields could be much better.

We turn onto an earth country road that is now dry. It is obviously very bad indeed when wet. We arrive at the farm and I see some new machine shops made of brick. The houses are rather poor and made of logs and wood and the streets are unpaved (K-2533).

This farm has 1,600 cultivated hectares out of a total area of 3,000 hectares. They have 100 hectares of apples and pears.^{1/} Because of the emphasis on milk we are immediately given figures as follows:

<u>Year</u>	<u>Centners of milk per 100 hectares</u>	<u>Kilograms of milk per cow</u>
1953	90.3	1,112
1956	216.4	2,017
1957	275.4	2,527
1958	330.0	2,900

This is the total milk, including that used by calves.

(Added later: Apparently the calves are weaned almost immediately and on other farms I learned that only about 70 percent of the total milk is sold. This 30 percent difference must be waste and milk fed to calves or pigs.)

^{1/} The printed booklet on the farm, the figures given me orally, and those in the subsequent table do not agree fully.

I see a rather poor cabbage crop and only fair potatoes and
 type. There are a few fruit trees. I see some poor legumes. We
 pass a field of barley that looks quite good and might run 35
 bushels per acre. Pastures are good with both cattle and sheep.
 Yet certainly yields could be much better.

We turn onto an earth country road that is now dry. It is
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 milk is sold. This 30 percent difference must be waste and milk fed
 to calves or pigs.)

1/ The printed booklet on the farm, the figures given are orally,
 and those in the subsequent table do not agree fully.



K-2533. July 26, 1958. Near Minsk. Part of
street on New Life Collective Farm.

K-2533

IV

K-2533. July 26, 1958. Near Minak. Part of
street on New Life Collective Farm.

Our time is very short so we don't get more facts, but are handed a little publication about the farm. Yet as I leave I am able to photograph the plan hanging in the entrance way, which reads as follows: (in translation):

SOCIALIST OBLIGATION

We, collective farmers of the kolkhoz "New Life", in response to the recommendation of the Jubilee Session of the Supreme Soviet of the USSR "To the Peoples of the Soviet Union"--to raise higher the banner of the popular Socialist competition for new achievements in economic and cultural attainments, we obligate ourselves in 1958 to reach the following indices:

In Field Production:

To Harvest From Every Hectare:

Grain crops - 22 centners
Potatoes - 160 centners
Vegetables - 200 centners
Corn for silage - 350 centners
Fodder root crops - 280 centners
Perennial grasses for hay - 25 centners

To Procure and Spread to the Fields:

Manure - 4,500 tons
Peat - 11,500 tons

To spread lime on acid soils - 100 hectares

In Livestock Production:

Milk from each grazing cow - 2,900 kg. milk
Obtain for every 100 hectares of agricultural lands:
Milk - 330 centners
Meat - 100 centners
Of which pork - 64 centners
Receive from each laying hen - 90 eggs
Shear wool from each sheep - 3.3 kg.

Our time is very short so we don't get more facts, but

are handed a little publication about the farm. Yet as I leave

I am able to photograph the plan hanging in the entrance way.

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We, collective farmers of the Kolkhos "New Life", in response to the recommendation of the Jubilee Session of the Supreme Soviet of the USSR "To the Peoples of the Soviet Union"--to raise higher the banner of the popular Socialist competition for new achievements in economic and cultural attainments, we obligate ourselves in 1955 to reach the following indices:

In Field Production:

To Harvest From Every Hectare:

Grain crops - 32 centners
Potatoes - 160 centners
Vegetables - 300 centners
Corn for silage - 350 centners
Fodder root crops - 280 centners
Perennial grasses for hay - 25 centners

To Procure and Spread to the Fields:

Manure - 4,500 tons
Fertilizer - 11,500 tons

To spread lime on acid soils - 100 hectares

In Livestock Production:

Milk from each grazing cow - 3,000 kg. milk
Obtain for every 100 hectares of agricultural lands:
Milk - 330 centners
Meat - 100 centners
Of which pork - 60 centners
Rabbit from each laying hen - 90 eggs
Shear wool from each sheep - 3.5 kg.



K-2645. July 26, 1958. Near Minsk. New Life
Collective Farm. Mother and children.

K-2642. July 26, 1958. Near Minsk. New life
Collective farm. Mother and children.



K-2535. July 26, 1958. Near Minsk. On New Life Collective Farm. Unloading green oats and vetch at dairy barn.



K-2536. July 26, 1958. Near Minsk. On New Life Collective Farm. Distant view of new orchard.

7-17

K-2532

K-2532. July 26, 1958. Near Minsk. On New Life Collective farm. Unloading green oats and vetch at dairy barn.

K-2532

8-17

K-2536. July 26, 1958. Near Minsk. On New Life Collective farm. Distant view of new orchard.

Procure for Collective Livestock:

Coarse feeds - 3,975 tons
 Succulent feeds - 5,200 tons
 Of which silage - 4,000 tons
 Fodder root crops - 1,200 tons
 Concentrates - 485 tons

Pay out For Each Labor Day: Money 8 rubles, Grain
 2.3 kg., potatoes 4 kg., coarse feeds 1.5 kg.

On a pole near the headquarters a blaring loud speaker apparently gives the official radio broadcast of news and music all the time.

Some of the soil slopes on this farm are fairly strong. These sloping soils are partly in pasture and partly in woodland. The people I see on the farm look to me a bit tired and just a bit shabby but the children seem well (K-2645). I see vetch and oats being used as a soiling crop. I should estimate the rye at about 25 bushels per acre. The corn is short and nitrogen deficient. It is said that it followed rye used for soiling and that, in turn, will be used for soiling.

I walk into a new building for storage, washing, chopping, and cooking potatoes that are fed to the dairy cattle. The dairy barn has concrete stalls. The cows are milked by hand, but equipment has been purchased for machine milking.

I see workers weeding rather poor-looking sugarbeets that are said to have followed rye cut green for soiling. At the back of the barn I see green-cut oats and vetch being unloaded from small horse-drawn carts (K-2535). There is a large manure pit. The manure is not well stored, and it is also hauled to the fields in

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the barn I see green-cut oats and vetch being unloaded from small

horse-drawn carts (K-2535). There is a large manure pit. The

manure is not well stored, and it is also hauled to the fields in

small horse-drawn wagons. They have a round concrete pit silo. The other farm buildings are made of wood and are not in very good repair.

I look at their tractors. They have 7 wheeled tractors and 4 crawlers. There are many small wagons for hauling. There is a small store on the farm. I am told that they will soon start new buildings for the farm families. They certainly need them.

We must start back to Minsk after only 35 minutes on this farm! Near Minsk I see an operating brick yard using material from the underlying marine clays.

We call briefly on the Minister of Agriculture of Belorussia. He tells me that a third of the collective farms and all the state farms now have milking machines. They recognize the need for more fertilizer and two plants are being built in Minsk. We discuss the need for good experimental design; and they say they realize the need for randomizing the plots for better statistical analyses. They also plan to design somewhat lighter machines for seeding. After the conference I note that a Tass correspondent was present, but all was very pleasant.

We then go to the airport and find that there has been some confusion over reservations. We have to leave behind Nelson, Thorne, Donnan, and Cline. Mrs. Nina M. Ryabova was extremely friendly, but apparently doesn't feel like talking so freely as she would like. Our Belorussian friends see us to the plane and the wheels are off the ground for Kiev at 11:50 a.m.

small horse-drawn wagons. They have a round concrete pit also.

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It would seem to me from the plane some of the podzolic soils are tending toward Brown-Forest soils. About one-fourth of the cover is woodland. The fields have a roughly rectangular pattern except for road and stream boundaries. The small family plots are darker green in color and have heavier yields than the other fields. It seems to me that there are far more public earth roads than are really necessary. These are probably an inheritance from an earlier pattern.

At 15 minutes we pass a small city.

In 25 minutes about a third of the cover is scrubby forest. The soils appear to be quite sandy with some irregular wet areas. Perhaps they are from cover sands of glacial origin. At 35 minutes out the cover is about one-third thin woodland and the soils seem to be very sandy with a fair proportion of wet soils only partly drained.

At an hour out we are roughly parallel to the Dnepr River. I see some stripcropping in straight lines, mainly east and west. I cannot tell whether the soil is a leached Chernozem or Gray-Forest. Most of the fields have a grayish-yellow surface in a complex pattern with dark wet soils. As we go on the amount of scrubby native forest along with some planted forest increases, apparently on sandy soils.

At 70 minutes we are back on darker colored soils. Possibly some of these are leached Chernozem, but more likely some sort of Gray-Forest or podzolic sandy soils. At 75 minutes we are over a small town and I see a few scattered farms near the city of Kiev.

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Perhaps these are simply workers' homes on fair-sized lots.

The wheels are down at Kiev at 1:11 p.m. We are met by Mr. Alekseevski, Vice-Minister of Agriculture of the Ukrainian Republic; Mr. S. M. Perekhrest, Director of the Ukrainian Institute of Water Economy; Mr. Alexander S. Skorodumov, Manager of the Soil Erosion Control Laboratory; and Mr. I. I. Basov, Vice-Minister of Agriculture for soil mapping.

We go to the Intourist Hotel. We have lunch and change some money. We take a short trip in the city where I have the experience of buying three Ukrainian ladies' blouses. Although this is a very old city, much of it looks new now since the larger part of its center was destroyed during the German war and has been rebuilt since 1945. The streets are wide and clean and the city seems a bit brighter than either Minsk or Moscow. This Saturday afternoon many people are out on the streets.

We are taken to an interesting old monastery with the name Kiev Pecherski. This was said to have been at one time the center of the Christian religion for a wide area including most of old Russia. Here one sees wanton destruction of the main cathedral by the Germans. This is a great pity since the cathedral was an excellent example of architecture from the 11th century.

We go down into the catacombs where the monks first started to live and study in 1025. In these catacombs are many relicts (or mummies) of famous monks and churchmen. In some of the cubicles are very nice paintings from the 15th to through the 18th century. In order to go down here one must carry candles, which apparently help finance the monastery. There are quite a few monks about.

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We go to the Intourist Hotel. We have lunch and change some
money. We take a short trip in the city where I have the experience
of buying three Ukrainian ladies' dresses. Although this is a very
old city, much of it looks new now since the larger part of its
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We are taken to an interesting old monastery with the name
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by the Germans. This is a great pity since the cathedral was an
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to live and study in 1025. In these catacombs are many relics
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are very nice paintings from the 15th to through the 18th century.
In order to go down here one must carry candles, which apparently
help finance the monastery. There are quite a few monks about.

The chapel is very crowded and many people cannot enter. Most of the people that I can see in the chapel are more than 45 years old, although there are some young people. Nearly all or all of the women wear white kerchiefs over their heads.

Our Intourist guide says that there are three active cathedrals in Kiev, several local churches, and a theological seminary for Orthodox priests.

We take a short look at the Ste.Sophia Cathedral which is now used as a museum. Unhappily, it is closed. We have a little drive along the Dnepr River and return to the hotel about 7:30 p.m. The others had come in about 5:30 p.m. after a very choppy flight. Happily, they had brought with them a combined soil map and farm plan for a collective farm near Minsk which I had been so anxious to get.

After dinner I do my washing and am ready for bed at 10:30.

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After dinner I do my washing and am ready for bed at 10:30.

July 27

This is Sunday and I hear early church bells. It is a nice sunny morning and I go for a short walk and look in the shop windows. Book stores and stores for sporting goods are quite prominent. Relatively, womens' dresses are not expensive, but mens' suits seem highly priced. I note a not very good one for 1,800 rubles. I see very small loaves of bread in the window for 60 kopecks and large ones for 2.7 rubles.

After breakfast our friends come, including Professor Skorodumov, manager of the Soil Erosion Control Laboratory, and agricultural officers of the Kievskaya Oblast. At 9:45 we leave in a small bus for the collective farm called October. We need to drive about 30 kilometers north of the city. Along the south side of the Dnepr River are high bluffs of loess, resembling those along the Mississippi and Missouri rivers. They have worked these steep bluffs into two or three steps in order to handle the drainage water through masonry chutes and to prevent slides and gullyng. The slopes are well planted with trees and shrubs. We cross the Dnepr River and pass over a wide, low sandy terrace that is flooded each year. Right near the river a large strip of riverwash is used as a beach for recreation. Then we go onto a second terrace that is also very sandy. Here there are excavations for sand used in glass making. Locally this is called a "slightly" podzolic sandy soil. The original cover was mainly pine and much of it is still in pine, scrubby because of war damage.

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We pass Brovari, a rayon headquarters. Here there is a double-track railroad. We turn off on an earth road and soon come to the headquarters of the October Collective Farm. We meet in a reception room, which is very clean and nicely furnished.

The chairman, Mr. Ivan M. Kolbasinski, speaks:

The farm was originally organized in 1928 and by 1934 all of the peasants were organized in a collective. Prior to World War II, the land occupied by this farm was included in 4 farms, not large enough to use machines. All operations were handled with animals. The buildings on all the farms were destroyed in World War II. It was difficult to start again because the Germans took all the animals. Not until 5 years after driving out the Germans was it possible to restore normal operations. Then in 1950 it was decided to unite the 4 original farms into this one now called October.

The farm now has 6,400 hectares of which 3,800 are under crops and 750 under pasture and meadow crops. The areas of crops are given to us as follows, in hectares:

Winter rye and wheat	1,200
Oats, buckwheat, and barley	800
Potatoes	500
Vegetables, including cabbage, tomatoes, table beets, cucumbers, carrots, and onion	200
Orchards	170
Fruit trees nursery	52

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carrots, and onion	200
Orchards	170
Fruit trees nursery	32

This farm supplies all farms about with small fruit trees, which are an important source of income. They use lupine a good deal on the poorer soils to improve fertility.

They have dual purpose cattle and other animals as follows:

Cattle	1,300 of which 550 are milk cows
Pigs	2,000 to 3,000
Poultry	11,000
Beehives	350
Horses	350

The farm and the buildings are fully electrified. This year all their machines were purchased from the machine and tractor station. These include 22 trucks, 14 tractors, 9 combine harvesters, 1 car, and the other necessary machines for tillage and the like.

On this farm are 1,200 families and houses. Of the total population of 5,000 there are 1,400 able-bodied workers. Women 17 to 55 years old are considered able-bodied workers although they can continue to work some after that age if they want to. Years for men are 17 to 60. Some of the boys can work during the harvest. (Many young men must be in the army now.)

The average size of the individual family plot is .5 hectare and they range from .3 to .6.

This year they are using about 1,050 tons of fertilizers. They buy the primary materials and mix them as needed. As near as I can make out, according to the soil map, they need 350 tons of ammonium sulphate, 600 tons of superphosphate, and 150 tons to 200 tons of

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On this farm are 1,300 families and houses. Of the total popula-

tion of 2,000 there are 1,400 able-bodied workers. Women 17 to 22

years old are considered able-bodied workers although they can continue

to work some after that age if they want to. Years for men are 17 to

60. Some of the boys can work during the harvest. (Many young men

must be in the army now.)

The average size of the individual family plot is 2 hectares

and they range from 1 to 6.

This year they are using about 1,050 tons of fertilizers. They

buy the primary materials and mix them as needed. As near as I can

make out, according to the soil map, they need 350 tons of ammonium

sulphate, 600 tons of superphosphate, and 150 tons to 200 tons of

30 percent potassium salt. The ammonium nitrates cost 150 rubles per ton; the superphosphate (18 to 20) 40 rubles per ton; and the potassium salt 50 to 60 rubles.

The potatoes respond very well to potassium. They have expanded their acreage considerably and also have increased the need for more potassium salt to 400 tons.

According to their records, the annual rainfall is between 550 and 600 millimeters. We are told that the soils are quite variable. The majority of the soils are called light clay loams. We would probably call them fine or very fine sandy loams. The organic matter is 1.5 percent. Then they have dark-colored soils in the lowlands, and some Alluvial soil near a small river.

We then discuss milk production. Last year they had an average of 3,521 liters per cow, or 28.9 tons of milk per 100 hectares. Their maximum yield from one cow was 6,500 liters.

The average yield of wheat is about 18.5 centners per hectare. But last year was better and they had 33.5; this year they expect 28. Because of using lupine and fertilizers regularly, they expect to raise the average yield of wheat to 30 centners (3 metric tons) per hectare, or 45 bushels per acre.

They show me a map interpreted from the soil map and tests for the need of lime. They have 4 units on this map as follows:

- (1) None required (only a small area)
- (2) 1 to 2 tons per hectare
- (3) 2 to 3 tons per hectare (This is the largest area on the farm)
- (4) 3 to 4 tons

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They tell me that the farm as a whole received 8,200,000 rubles gross income. Of this the collective farmers received 4,200,000 rubles. For each work-day unit they received:

2.0 kilograms of wheat and rye

2.5 kilograms potatoes

1 kilogram vegetables

2.5 kilograms of fodder

7 rubles in cash

This year they expect to do better and to have 10 instead of 7 rubles in cash for each work-day unit.

I ask about the prices received and they give me the following "fixed" prices, in kopecks per kilogram:

Potatoes	35
Vegetables	60
Wheat	29
Rye	27

The "second" price for wheat is given as 1.1 rubles per kilogram, and for rye at 95 kopecks per kilogram.

The low prices are those for the quota or required delivery to the government and the second prices are for those delivered that are above the quota. This first price is sometimes called the "delivered" price and the second the "fixed" price. Of course, actually all prices are fixed. As mentioned earlier in these notes, a decision was taken by the government this year to make just one price. This will have the

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effect of increasing farm income and the preliminary estimates on this farm suggests that they will gain a million rubles by this change. They tell me that their main effort on the farm is to supply vegetables, fruit, and milk.

The farm bought the machines with its own money. Other farms have been given credit for two or three years.

It seems to me that it must take a lot of bookkeeping for a farm of this sort. They tell me that they have 18 persons for this work. There are 11 persons on the management board, 9 of whom work in the fields also. The farm has one agronomist.

In Kiev there are special selling organizations for milk and vegetables. The farm delivers the milk to the plant and to the shops as suggested by the selling organization. The grading of fruits and vegetables is done on the farm.

We get into the bus for a visit to the fields. Now the wind is blowing very hard. We first go out into a grain field and I look at the soil -- a Gray-Forest soil on the third terrace of the Dnepr River. The soil is nearly level, except for a slight mezzorelief, and is well drained. (K-2537)

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K-2537. July 27, 1958. Near Kiev. View where soil profile is described on third terrace above the Dnepr River on October Collective Farm.

K-2537

ROYAL MAIL
as above, with
with
icy material.

K-2537. July 27, 1958. Near Kiev. View
where soil profile is described on
third terrace above the Dnepr River
on October Collective Farm.

A _{1p}	0 - 7"	Dark grayish-brown (10YR 4/2) very fine sandy loam to coarse silt loam. Firm but easily friable.
A ₂	7 - 10½"	Transitional
B ₁	10½ - 14"	do
B ₂	14 - 24"	Brown (7.5YR 4/4) and strong brown (7.5YR 5/6) mottled silt loam rich in very fine sand. Irregular coats on peds of light brownish-gray (10YR 6/2). Weak to moderate, medium blocky. Easily friable. Slightly vesicular. No clay skins. Some threads of white free silica (?)
B ₃₁	24 - 31"	Yellowish-brown (10YR 6/4) silt loam to light silt loam with weak coarse blocky structure, vertical threads of (10YR 6/2) silt. Very friable.
B ₃₂	31 - 42"	Light yellowish-brown (10YR 6/4) silt. Very friable mass.
C	42+	Light yellowish-brown (10YR 6/4) compact but very friable silt. Upper boundary very sharp and may represent an old water table boundary. A few krotovinas and a few calcium carbonate concretions.

There are no carbonates above the C. The pH of the surface soil is said to be 5.5. The roots go down to the C but not far into it.

I see a field with volunteer rye now being plowed and harrowed in one operation for winter cereal. The strawberries do not look too well. They would benefit by some supplemental irrigation. The potatoes are uneven. Some have nitrogen deficiency. I would say that the unevenness is due to careless spreading of manure.

Some of the low spots in the field appear to be a bit more clayey. Very little erosion or soil blowing is evident.

A_{1p} 0 - 7" Dark grayish-brown (10YR 4/2) very fine sandy loam to coarse silt loam. Firm but easily friable.

A₂ 7 - 10 1/2" Transitional

B₁ 10 1/2 - 14" do

B₂ 14 - 24" Brown (7.5YR 4/4) and strong brown (7.5YR 5/6) mottled silt loam rich in very fine sand. Irregular coarseness on beds of light brownish-gray (10YR 6/2). Weak to moderate, medium blocky. Easily friable. Slightly vesicular. No clay skins. Some threads of white free silica (?)

B₃₁ 24 - 31" Yellowish-brown (10YR 5/4) silt loam to light silt loam. Weak coarse blocky structure, abundant threads of (10YR 6/2) silt. Very friable.

B₃₂ 31 - 42" Light yellowish-brown (10YR 6/4) silt. Very friable mass.

C 42+ Light yellowish-brown (10YR 6/4) compact but very friable silt. Upper boundary very sharp and may represent an old water table boundary. A few krotovinas and a few calcium carbonate concretions.

There are no carbonates above the C. The pH of the surface soil is said to be 5.2. The roots go down to the C but not far into it. I see a field with volunteer rye now being plowed and harrowed in one operation for winter cereal. The strawberries do not look too well. They would benefit by some supplemental irrigation. The potatoes are uneven. Some have nitrogen deficiency. I would say that the unevenness is due to careless spreading of manure. Some of the low spots in the field appear to be a bit more clayey. Very little erosion or soil blowing is evident.

Here as elsewhere they use a great deal of green freshly cut fodder that is hauled to the feeding areas, mostly in small horse-drawn wagons.

We stop near a good field of wheat that may run 45 bushels to the acre. It is a soft winter wheat with short straw and good heads. I finally estimate 3 tons per hectare and the farm manager 3.5 tons per hectare, and maybe he is right. (K-2538)

We stop briefly to look at the milking area for the dairy cows. These are long sheds without sides that are simply covered stalls (K-2539). Just now a truck load of milkmaids comes up and it is interesting to watch the cows come up to be milked. Milking machines are used.

I see some wine grapes and these are made into wine for local use on the farm. I see another field of good-looking strawberries although they are a bit weedy. Nearby is a good-sized planting of currants.

I look hurriedly at a Humic-Gley soil that was obviously quite variable to begin with and has been disturbed by ancient building and by long use for crops and pasture. Locally this soil is called a Meadow-Chernozem with gley. In the slightly uneven plain are small marshy spots. (K-2540)

A ₁	0 - 24"	The horizon may have a lower boundary at 12" or 36". Very dark brown to black (10YR 2/1 to 2/2) silt loam. Mixed weak blocky and granular.
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K-2538. July 27, 1958. Near Kiev. Wheat on October Collective Farm. (Left is Chairman Ivan M. Kolbasinski: right is chief agronomist on farm. Yield 3.0 to 3.5 tons per hectare).

K-2538

2-14

K-2538. July 27, 1958. Near Kiev. Wheat on October
Collective Farm. (Left is Chairman Ivan M.
Kobzatski; right is chief agronomist on farm.
Yield 3.0 to 3.5 tons per hectare).

- (B) In a few places in the pit I see a suggestion of a weak B between the A and G.
- G 24+ Very dark brown (10YR 6/2) silt loam with yellowish-brown (10YR 5/4) mottles. Structureless but friable.

The soil has many krotovinas and is calcareous throughout.

Although the soil is cropped as it is, it would obviously benefit from tile drainage.

Then we are taken to a nice looking orchard of apples and pears. Nearby I see a good plot of "semi" sweet corn grown on a Gray-Forest soil that is somewhat like the first profile. I walk past a large planting of grafted apple seedlings. These little trees are sold to other collectives at 4.5 rubles each. They are now selling about 90 thousand per year.

They get 4 rubles per kilogram for apples in the farmers' market. As the season advances prices are lower. This horticultural work looks good and is said to account for roughly one-half of the income for the farm.

Now we sit down in the orchard to a table loaded with fruit and wine. I am much impressed by this farm and its management, but certainly there are too many people on it for the acreage and for the production.

We drive back into Kiev. Around the city here too there is much new building of factories and apartments.

In a few places in the plot I see a suggestion of a weak B between the A and C.

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K-2539. July 27, 1958. Near Kiev. Milking and feeding area for dairy cows on October Collective Farm.



K-2540. July 27, 1958. Near Kiev. Humic-Gley soil where profile is described on October Collective Farm.

8-2539

VI

K-2539. Only 1/2 of the original
no 2/2539. Only 1/2 of the original
no 2/2539. Only 1/2 of the original

8-2540

VI-4

K-2540

We are back to the hotel at 3:15 p.m., for a slow lunch-dinner and leave for the agricultural fair at 5:40 p.m. Now it rains. This fair is modeled somewhat after the one in Moscow. It includes all agriculture and industry. We visit the main agricultural exhibits where we are reminded that there are 600,000 square kilometers in the Ukraine. In the north the podzolic soils are relatively poor. Animal husbandry dominates, mainly dairying and pigs. Potatoes and lupines are widely grown partly for the pigs. Here the rainfall is about 550 to 600 millimeters.

Next is the forest and steppe with Gray-Forest soils and Chernozem where the rainfall is 450 to 500 millimeters. Sugar-beets are very important and also winter wheat and corn.

The steppe area covers the southeastern part of the Republic. The northern part of this region has 450 millimeters of rain and the southern 300 millimeters. They have 8 million hectares of winter wheat, said to be high in protein, around 18 percent. They claim that their Ukrainian variety is better than the Manitoba one. They also have considerable corn. They speak briefly of the Carpathian Mountain where there are orchards and some animal husbandry. In the Crimea they have orchards, vines and tobacco.

It is said that the first task of each of the research institutes in these several regions is to make soil maps in order to develop a sound basis for research and for devising new methods and extending

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the information to the farmers. We are shown many pictures of tillage practices including the operation of machines to windrow the snow in winter in order to hold the maximum amount on the fields.

We take a rapid look at exhibits on soil conservation that outline the various crop rotations, methods of forest planting, use and construction of terraces, and the use of drop structures.

We are told that soil blowing affects some 200,000 hectares and shelterbelts are emphasized. Sand dunes are stabilized by planting pine trees with peat as a soil conditioner together with other shrubs, especially willow, to protect the young trees. The exhibit on shelterbelts shows rows of trees on all field margins and with cross rows, except for gaps at the ends for the passage of machinery and some wind.

This whole exhibit covers about 900 acres of which 380 are under forest. Each agricultural pavilion has land for demonstration. We drive by these plots and see many kinds of crops, fruits, shelterbelts, crop rotations for the various regions, machinery, fish ponds, poultry, cattle, pigs, goats, and so on. Carp are grown in the fish ponds on collective farms.

We are shown a large-scale model of the plans for the Dnepr River involving 14 dams for 2,700,000 kilowatts of electricity and for irrigation. They also have power stations on the small rivers for another 800,000 kilowatts. In this short lecture I am not sure what is done and what is planned. They also have navigation on the

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 what is done and what is planned. They also have navigation on the

river from the sea to Gomel, a distance of 1,400 kilometers. I am told that somewhat less than half the farms are electrified and that farms get about 10 percent of the electric energy. I suspect this is high.

We return to the city and go to the cinema to see Dostoyevski's The Idiot. This is a beautiful film in color, very well directed and very well acted. It reminds me of some of the films, such as The Grand Illusion, directed by Renoir. Then we are back to the hotel for a late supper and a bit late to bed.

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July 28

This is a gray rainy morning. First we are to see the Minister of Agriculture, Mr. Spivak, and then go in cars to Poltava.

We begin our meeting in the Ministry at 9:25. The Minister says that Ukrainia has well developed agriculture and industry. They produce 150,000,000 tons of coal, 20,000,000 tons of cast iron, 19,000,000 tons of steel, and 19,000,000 tons of rolled steel. They have a big chemical industry and produce many heavy machines including machine tools.

At the present time 46 percent of the labor is in industry and service and 54 percent on farms. Obviously, the farms are over populated. I point this out and the Minister says that the proportion in industry will steadily increase. New factories are being built. He promises to give me figures on population distribution as projected ahead.

(We need to start drinking wine now at 9:35).

He tells us that 72 crops are grown in the Republic. Legumes and winter wheat account for 11,000,000 hectares. Other main crops are as follows:

Corn, 6.5 million hectares

Sugarbeets, 1.33 million hectares

Sunflowers, 1.00 million hectares

Potatoes, melons, etc., 2.0 million hectares

Fiber flax, 0.2 million hectares

They also grow tobacco and shag, Nicotianarustica, which accounts for 60 percent of the production of the USSR.

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They also grow tobacco and shag, Micetianagustica, which accounts for 60 percent of the production of the USSR.

They expect to have one million hectares under orchards and vineyards according to the seven-year plan beginning in 1959. Now 220,000 hectares are irrigated. Some works are completed, mainly in the south. Irrigation, he says, is a recent development; there was no irrigation before the Revolution. Thirty thousand hectares will be newly irrigated this year and 180,000 more during the seven-year plan. These new projects will be much larger than the old ones, including a large plan for the northern Crimea. He says that this plan is not entirely firm and they are considering 250,000 new hectares as a possibility under the plan. I ask him what would be irrigated and he mentions rice, potatoes, vegetables, orchards, vineyards, small fruits, and perennial grasses. Then he says, "crop rotations," so I guess he gets everything.

Now 1,030,000 hectares have been drained. The seven-year plan calls for the drainage of 650,000 more hectares. This he said might need to be reduced to 450,000.

The farms are expected to pay back in 2 or 3 years all costs of the irrigation systems. I don't presume that this includes the large dams but apparently it does include the canals and small structures. The government pays the salaries of the engineers and design costs. They expect that 20 percent of the irrigation will be by gravity flow and about 80 percent by pumping, of which 5 percent or a little more will be applied by sprinklers.

The seven-year plan does not call for any great change in cropping patterns except for substantial increases in sugarbeets and fodder.

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The seven-year plan does not call for any great change in cropping patterns except for substantial increases in sugarbeets and fodder.

Animal production will be increased 2.5 to 3.0 times present production. The main target is to improve practices through better rotations, more fertilizers, and better varieties. They plan to increase shelterbelts some. He tells me that in the south the Chernozem soils give 4 tons of wheat per hectare in good years (about 60 bushels per acre).

They have 84 experimental stations in Ukrainia, of which 17 are research institutes. Each one has laboratories to determine what fertilizers are needed by farms. In addition, each of the 750 "micro-regions" has its own agro-chemical laboratory.

The Minister is very friendly. He is planning on going to the United States next September. As we leave he gives me a table of projected population as divided between the towns and the farms:

Year	Percent population	
	Towns	Farms
1913	19.3	80.7
1939	20.3	79.7
1956	40.0	60.0
1965	60.0	40.0

After this pleasant talk we return to the hotel and pack. We have a long and wasteful wait for the Ministry cars. Excuses are that since yesterday was Sunday, a rest day, the cars could not be gotten ready then. On top of that there was supposed to have been a flat tire this morning.

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While waiting for the cars I talk briefly with a Florida couple staying at our hotel. They complain rather bitterly about the bad beds, especially since they are paying \$35 a day apiece. Too bad! My bed was fine.

We are ready to leave at 12:30 for Poltava in a light rain. These Zim cars do not have much room for baggage because the boys carry reserves of gasoline. We cross to the north side of the Dnepr River over the beautiful, all-welded bridge. We pass over the first terrace, which is 2 to 15 kilometers wide. There are some wet meadow soils but mostly podzolic sands and sandy loams. We then go up to the very sandy second terrace of weakly podzolized soil under pine forest. This appears to be 3 to 15 kilometers wide. The forest is scrubby since most of it was cut by the Germans. I see some plantings of pine (Pinus sylvesterus.) Some stands have oak also. Wet sandy soils have birch.

At least we are starting out on a nice black-top road with young trees along the side. I see a few orchards. In the very sandy areas with dune relief, willows are used to protect the young pine. Later these are cut out for making baskets.

(I am beginning to think these Zim cars are very good for country travel. And the clocks work!)

As we move onto the third terrace I see soils something like those on the farm yesterday, perhaps a bit more silty. Cereals have just been harvested. It rains.

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just been harvested. It rains.

We pass Borispol, a rayon center, at 1:10 p.m. I see a grassed airfield here with many planes. The machine and tractor station here is being converted to a repair station. Most of the small home plots have vegetables, sunflowers, and fruit. A few have flowers.

Beyond in the rather open country are cereals and corn, and perennial grasses on the low-lying Humic-Gley and Bog soils. Apparently all of the cereal straw is saved. Now there is a mixture of deep, leached Chernozem and podzolic soil. We pass villages where nearly all the houses have thick thatched roofs. And then more planted forest on sandy podzolic soils. But mainly we drive over a large area of the leached Chernozem with some Humic-Gley. The landscape is open and nearly treeless. The crops are mostly small grains. I see corn, thick and short for fodder. This is a beautiful landscape of undulating leached Chernozem with some shallow closed basins and a few wooded sandy podzolic areas. We pass another collective farm with new long cow sheds but most of the homes are small and have thatched roofs.

We make a short stop in a wide wet area with peat now being reclaimed with mole drains for a controlled water table. A canal is built through it. Beyond is a complex of leached Chernozem and sandy podzolic soil. We cross the Nedra River at 1:55 and through pine forest about 10 to 20 feet high on sandy soils. The farming is more diversified, with corn, sunflowers, potatoes, and a little fruit as well as cereals. A few new shelter strips here are mainly oak.

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oak.

As we go on, the Chernozem is darker (said to be 3 to 3.5 percent organic matter). The many nearly level areas appear to be a bit gleyed. We pass the 128 kilometer post at 2:30. I see essentially no erosion. We pass a small area of peat being cut for fuel. We pass the road to Piryatin at 2:50 p.m. (K-2541) As we pass a farm I see elderly women along the road each herding a cow, probably from the family plots. The houses are thatched and have whitewashed walls.

We go now from the third terrace of the river onto the plateau. The thick Chernozem from loess is richer in humus and is said to be more than one meter deep. The landscape is nearly level to gently undulating. Droughts are said to be uncommon. Some of the soil is a bit wet. Here there are sunflowers, cereal, fallow, and some potatoes. I also see some fruit trees and corn.

Along the road are very few signs except for large colored pictures of agricultural, industrial, and historical scenes. Some of these are for urging people to do better and I suppose some for education.

We are said now to be moving into the "forest steppe zone." We see a lot of mud as we pass Lubny at 3:50.

We cross the Sula River which has a wide wettish flood plain. I see cereals, flax, hemp, and corn on the better drained soils. On the undulating Chernozem beyond are cereals, potatoes, sunflowers, fallow, and flax. There are some very large fields of wheat. The rain has stopped. My guide says that the season is cooler and rainier than normal.

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K-2541. July 28, 1958. East of Kiev. View of Chernozem soil from high railway grade.



K-2542. July 28, 1958. Near Mirgorod. Young roadside shelterbelt.

K-2541

VI

K-2541. July 28, 1958. East of Kiev. View of
Chernobyl soil from high railway grade.

K-2542

IV

K-2542. July 28, 1958. West of Kiev. View of
Chernobyl soil from high railway grade.

I see people plowing directly up and down a fairly strong slope. I point this out to my guide and he says, "But that is forbidden!" Collective farms here are said to be quite wealthy. Most of the houses have near them little piles of peat bricks for fuel. There are a few new windbreaks but not many. I photograph one. (K-2542)

We pass Mirgorod at 4:06 (Gogol wrote about this place.) I notice small garden plots between the pavement and the right-of-way boundaries. I am told that farmers can have these in compensation for removing snow and looking after the roadsides. We cross a small river with a grassy flood plain used for pasturing dairy cows.

Out in the plain I see some small mounds about 20 feet high. Some of them have triangulation towers on them now. They are said to be ancient "watching" hills made about 500 years ago.

We pass a small ravine, well grassed with diversion terraces. (Added later: I found these to be rare in the Soviet Union.) The roadside seems lush and green for Chernozem in mid-summer.

As we go on there is more relief and some hazard of both sheet and gully erosion.

Manure is hauled into the fields and put in piles as described by Palissy in the 17th century in France. We pass through the valley of the Psel River. The well drained soils on the terrace are Chernozem from loess, perhaps partly reworked by water. Crops are hemp, sunflowers, corn, and flax with grass in the moist places. The sandy

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parts of the terrace have a few pine trees. The collective farms here are said to be "wealthy." The people live in small, nearly square houses with very few tiny windows and thatched roofs. Some of the walls are whitewashed and some are blue. A few new houses are larger and have steel roofs, but even these do not suggest "wealth" to me. But of course, this is a comparative term.

We are soon back into a rolling plain with some erosion hazard. The young shelterbelts should be supplemented with diversion terraces. The corn is short and somewhat nitrogen deficient. The soils are said to be Degraded Chernozem; perhaps, or maybe an oromorph phase of ordinary Chernozem.

Here, 40 kilometers northwest of Poltava, we are met by the agricultural administrative officers of the Poltavakaya Oblast. They lead us to a collective farm named after Stalin. A part of it touches the road. Here on the margins of the river terrace the Chernozem has slopes up to 30 percent. My guide calls it "restored Chernozem." This is really kind of silly. The soil on the steep slopes has had some erosion and is now fairly well stabilized with grass, trees, and shrubs. (K-2543) The woody vegetation is used to stabilize the gullies. Unhappily there are no diversions. But of course this has not recreated the Chernozem A horizon. The lowlands along the river have been drained.

There are said to be 7,000 hectares in this farm including uplands, escarpments, and alluvial plains. They grow grain, sugarbeets, dairy cattle, sheep, swine, and poultry. The dairy cattle are fed silage, chopped straw, cake from sunflower seeds, and sugarbeet waste.

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K-2543. July 28, 1958. Near Poltava. View of terrace slope on Stalin Collective Farm. Plantings of trees and shrubs to prevent gullies. No diversions. Probably somewhat eroded Chernozem.

K-2543

7-IV

K-2543. July 28, 1958. Near Paltava. View of terrace slope on Stalin Collective Farm. Plantings of trees and shrubs to prevent gullies. No diversions. Probably somewhat eroded Chernozem.

After this stop to view very ordinary plantings on an escarpment, we drive toward Poltava. I am told that the direct road to this farm headquarters is impassable. We cross another valley where simple diversions and chutes would be very helpful to control gullies.

Then to my surprise we pass a nice apple orchard and some pears. But then a part of the orchard is not so good. I see more potential gullies needing diversions. As we approach Poltava I see more new shelterbelts or windbreaks with 4 or 6 rows of trees.

We bypass Poltava and continue east. We enter onto another very sandy second terrace with natural pine and shrubs and planted pines and oaks. We turn to the south on a poor earth road that is probably better than the silty ones after all this rain.

But the road gets worse. This is turning out to be a wild ride. It is now 6:25 p.m. and we are still out in an area of mixed pine woods and poor pasture.

We pass some pretty sticky villages and come to a collective farm headquarters called Stalin. I had supposed this is part of the one we saw from the road; but I now think it another. The forest plantings here are supposed to be 20 years old. Sometime ago the sand was blowing dangerously but now it is under control. Here, we are on the left side of the Vorksla River which has a flood plain about 12 kilometers wide. The reforestation on the very sandy soils is started first with willows and then pine. The level areas are used for lupines. The sand is said to be 12 meters deep. I am told that the oaks indicate clayey soils, but this is doubtful to me even if

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we substitute "silt" for "clay."

They grow corn and buckwheat here but rye is said to be the best crop.

I meet the chairman of the farm, Ivan S. Dyakonenko. He shows us a field of sugarbeets on a smooth slightly wettish sandy loam soil that is not artificially drained. The beets look good. He tells us they use 20 tons of farm manure per hectare and .7 tons of mineral fertilizer consisting of superphosphate, sodium nitrate, and potassium chloride.

For corn they use 10 tons per hectare of "well done" farmyard manure and .15 tons of superphosphate and .15 tons of sodium nitrate. (Added later: This is probably a translation error for ammonium nitrate). He claims yields of 4 tons of grain per hectare and 40 tons of sugarbeets. Last year they had 49 tons of sugarbeets on some fields and an average of 33.7 tons on 100 hectares.

Across from the sugarbeets I look at the rather lush family plots of corn, string beans, and squash all planted together. (K-2544)

I get a little mixed up about this farm and whether or not it is a part of the one near the main road. The chairman says that he has 6,000 hectares and that he follows two ten-year crop rotations. Probably this is a different one. He shows us a combined soil map and farm plan map. Although most forest land is in government preserves this farm has 580 hectares of forest from which the farm sells products.

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sells products.



K-2544. July 28, 1958. Near Poltava. Stalin Collective Farm.
Individual family plots have best crops. (Dr. Cline).

K-2544. July 28, 1958. Near Poltava, Galia Collective Farm.
Individual family plots have been cropped. (Dr. Cline).

The chairman has been in charge since 1928 except for the war years. He has received the Order of Lenin and over 40 other members have had awards for their work. There are 988 families. 880 work on the farm and many others work in the town.

The Germans destroyed every building. Immediately after the war people lived in holes in the ground.

Their crops are roughly as follows:

Corn for grain, 650 hectares

Potatoes, 210 hectares

Sugarbeets, 100 hectares

Vegetables, 90 hectares

Besides there are unrecorded areas of small grains and perennial grass.

They have 520 milk cows averaging 3,340 liters. This year they have had an average of 1,900 liters from January 1 to July 20. Each day they deliver about 5 tons of milk to the processing plant.

Pigs number 1,500, of which 130 are sows.

They have 658 sheep, both black and white fleeces of fine wool.

The farm has 4,000 chickens with an average of 97 eggs per hen.

They have 2,500 ducks and 150 turkeys.

They are starting with 40 silver foxes.

Finally they have 200 beehives.

The manure is broadcast from heaps hauled into the field. Fertilizer is applied by seed drills and some by plane. About one-third of the area gets fertilizer in rows; about two-thirds is fertilized in the fall by drills or by plane on the surface and then plowed down. Corn and sugarbeets get side-dressings of nitrogen and phosphorus after the crop is up.

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(While we discuss this by the road a small horse-drawn wagon goes by with green-cut forage).

We go to the manager's home for food, drink, and toasts at 7:30 and arise at 9:00 p.m.

Then we start back for the 40 kilometers of terrible road. The driver tries a different way and gets stuck in the middle of a village. We turn around and take another road and wait for the others. I notice that few of the farm houses in this village have a light. What a terrible road!

We get back to the hotel in Poltava at 10:30. I am so tired I can hardly walk. As I start to undress I am dismayed to learn that I must go to another Russian banquet put on for us by Mr. Taran, chief agricultural officer of the Poltavskaya Oblast! Never in my life have I felt less like a banquet. Further it is about 3 blocks from the hotel and we have the usual delays.

I can't describe this banquet. I am finally back and ready for bed at 12:15, and thus passes one day to another.

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July 29

I am up about 6 o'clock on a bright and sunny morning. I take a short walk along the main shopping street. People here are only fairly well dressed. I am back at the hotel and wait for our hosts who are supposed to be here at 8:30. I resent the time I waste in waiting.

We go down to the restaurant for breakfast. Then it rains. Breakfast is not over until 10:15! I sometimes wonder if part of these delays are not planned so that either it is too dark for us to see or we are too tired.

We go to the office of the agricultural administrator of the Oblast. The farms here are growing mainly cereals and corn along with sugarbeets, dual purpose cattle, pigs, sheep, and poultry. He gives us a summary of production in the Oblast. I notice pictures of Lenin and Krushchev in the office.

They tell me that all the corn grown is hybrid with two main varieties VIR-25 and USPEKH (Success).

He says that soil erosion is serious in this Oblast and that there is some soil blowing. About 120,000 hectares have some erosion hazard. This amounts to 3.4 percent of the area of collective farms. (Added later: In comparison to the United States, the erosion hazard is much less. The most critical places are along the ravines branching off from entrenched rivers.)

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hazard. This amounts to 3.4 percent of the area of collective farms.

(Added later: In comparison to the United States, the erosion hazard

is much less. The most critical places are along the ravines branching

off from entrenched rivers.)

He tries to explain to us the general principles of the crop rotation systems. Winter wheat is sown commonly after three previous crops. For example, they may have clean fallow from either autumn or spring plowing and perennial grasses prior to the winter wheat. Winter wheat often follows corn harvested green for fodder. Clean fallow is cultivated to hold as much water as possible. (Weeds are a serious problem here.) The last cultivation is at the depth of sowing. After harvesting hay in June or July plowing is about 20 to 24 cm. A roller follows the plow. They use roughly the same practices on other crops but the timing is different. The recommendation is to plow immediately after harvesting wheat. If for some reason that cannot be done, the field remains in stubble.

In this oblast there are 731 collective farms. Only two machine and tractor stations remain in operation. The others have been reverted to repair stations. He says that another administration looks after the state farms.

Much of this discussion is a waste of time. I strongly object to lunch at 4 and then drive 350 kilometers to our next overnight stop.

At 11:00 we go to the Poltava Provincial Agricultural Experimental Station. It is said that this station was started 74 years ago by the Poltava Agricultural Association. For some 15 years or more they asked for help and the Moscow government refused. At first they had only 23 hectares. Until the Revolution the station had

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limited facilities; yet some local problems were solved, especially on tillage, fertilizer use, and the introduction of new crops. Then corn and sorghum were brought in. They have many varieties of alfalfa. They say that the Grimm variety of alfalfa came from here.

After the Revolution the land area was extended to 1,500 hectares. The area of study was also extended. They now have laboratories for soil science, agro-chemistry, fodder crops, and so on. Since 1956 the station has become a very complex research station with about 10 sections:

Agronomy

Fodder crops

Meadows

Seed selection and breeding

Agro-chemistry and soil science

Animal husbandry

Mechanization

Horticulture

Agricultural economics, and organization of collective farms.

They have a large experimental farm of 5,000 hectares. They have 1,500 cattle and 200 sows with an annual pig production of 5,000.

We go out into the field to see experiments on the protection of slopes from erosion. We see some stripcropping on the slopes to one of the ravines. (K-2545) Fortunately, as I see it, the erosion problem is not serious except on these ravines and escarpment slopes.

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K-2545. July 29, 1958. Near Poltava. Poltava Provincial Agricultural Experimental Station. Stripcropping on side of old ravine. (Probably degraded Chernozem).

K-2545

III

K-2545. July 29, 1958. Near Poltava. Poltava Provincial
Agricultural Experimental Station. Stripplotting
on side of old ravine. (Probably degraded Chernozem).

I see some rather poorly designed terraces on slopes that are all in grain. I take a photograph of the stripcropping with corn fodder and permanent meadow, and with a forest belt on the upper rim. (K-2646) Strips are straight and thus only approximately on the contour. They say they can use machines on slopes below about 40 percent.

Here they explain that they have a section on mass experiments and for collective farm organization that studies the application of both mineral and organic fertilizers and the use of azotobacter and phospho-bacterin.

They show me a detailed soil map of a collective farm on a scale of 1:10,000. I am told that investigations were made at a scale of 1:25,000. They also have a farm plan map at 1:25,000. On a third map the local soil types are grouped in accordance with the seriousness of sheet erosion and other interpretations. Needs for erosion control are shown on a separate map. These maps are accompanied by a 36-page typed report with descriptions of the soils and recommendations for their use.

They tell me that they are now making soil maps of all collective farms at scales between 1:5,000 and 1:25,000. They say that the work will be completed in three years by the 40 institutions in the whole of the Republic. The cost of the mapping is said to be 2 rubles per hectare, which suggests that the work is not very detailed.

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Although this work is undoubtedly very helpful, it could be considerably better. I have a low opinion of the so-called erosion research.

Here on a permanent grass plot, (K-2646) I look at what I should call a Degraded Chernozem or Degraded Brunizem, locally called a dark Gray-Forest soil, slightly washed. The soil is from loess on a 20 percent slope of an old ravine side. It is said to have been plowed and cropped but has been left in grass for a long time.

A _p	0 - 6"	Dark brown (10YR 3/3) silty clay loam. Mixed moderate very fine subangular blocky and medium granular; slightly firm; clear boundary.
A ₂	6 - 13"	Dark yellowish-brown (10YR 3/4) silt loam. Very weakly prismatic; slightly platy; friable.
B ₂₁	13 - 21"	Silty clay loam with dark brown (10YR 6/3) base color and light grayish-brown (10YR 6/2) coats on weak prismatic peds that are friable to medium subangular blocky. Some faint white coatings. Gradual lower boundary.
B ₂₂	21 - 32"	Very dark brown (10YR 2/2) silty clay. Faintly prismatic that easily falls into medium to coarse angular blocky. Moderately firm. Some uneven grayish coats but faint if any clay skins; gradual boundary.
B ₂₃	32 - 40+ 4	Grayish-brown (10YR 4/2) silty clay. Moderate prismatic that falls into coarse angular blocky that is moderately friable. Some gray coats and some clay skins of very dark grayish-brown (10YR 3/2).
B ₃	40 - 55+	Brown (7.5YR 4/4) silty clay loam with light gray (7.5YR 7/2) silt coats. Moderate, medium to coarse, prismatic that falls into firm angular and sub-angular, moderate to coarse, blocky. About 30 percent of ped faces have clay skins of dark grayish-brown

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Dark brown (10YR 3/3) silty clay loam. Mixed moderate very fine subangular blocky and medium granular; slightly firm; clear boundary.

A₁ 0 - 6"

Dark yellowish-brown (10YR 3/6) silty loam. Very weakly prismatic; slightly plastic; friable.

A₂ 6 - 13"

Silty clay loam with dark brown (10YR 5/3) base color and light grayish-brown (10YR 6/3) coats on weak prismatic beds that are friable to medium subangular blocky. Some faint white coatings. Gradual lower boundary.

B₁ 13 - 21"

Very dark brown (10YR 2/3) silty clay. Fairly prismatic that easily falls into medium to coarse angular blocky. Moderately firm. Some uneven grayish coats but faint if any clay skins. Gradual boundary.

B₂ 21 - 32"

Grayish-brown (10YR 5/3) silty clay. Moderate prismatic that falls into coarse angular blocky that is moderately friable. Some gray coats and some clay skins of very dark grayish-brown (10YR 3/3).

B₃ 32 - 40+ 1/4"

Brown (7.5YR 4/6) silty clay loam with light gray (7.5YR 7/2) silty coats. Moderate, medium to coarse prismatic that falls into fine angular and subangular, moderate to coarse, blocky. About 30 percent of bed faces have clay skins of dark grayish-brown.

B₄ 40 - 55+



K-2646. July 29, 1958. Near Poltava. Poltava Provincial Agricultural Experimental Station. Stripcropping; a shelterbelt marks upper slope.

K-2646. July 29, 1958. Near Poltava. Poltava Provincial
Agricultural Experimental Station. Stripcropping
a shelterbelt marks upper slope.

Unhappily, the pit ends in the lower B₃. No doubt the C is loess. One is surprised to see such a well-developed profile on a 20 per cent slope. The slope has a slight bulge and the profile is just on the lower part of this slight bulge.

A sample was taken at the surface: 4" x 4" x 4".

This profile of Degraded Chernozem indicates a deep natural soil so I am sure that there has been very little accelerated erosion here. In the Middlewest of the United States the profile would be very much shallower in such a situation. This checks with the statement of our guides that they get few intensive rains of which we have so many in the United States.

I look briefly at their crop rotations in a nearly level area on what they call a dark Gray-Forest soil that I should call a Degraded Chernozem. They say their best spacing for corn (K2647) is about 70 x 70 cm. Much of it is harvested for silage in the dough or milk stage. It should be added that nearly all corn is planted with the checkrow system, widely used in the United States when I was a boy. With better machines for cultivation and experience I should think they would drop this practice.

They explain the 10-year crop rotation and I find it hard to follow. Apparently perennial grass is not counted in the total cultivated land on the farm even though it is included in the rotation.

1. Perennial grasses and legumes (mostly alfalfa).
2. Perennial grasses and legumes
3. Winter wheat

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K-2647. July 29, 1958. Near Poltava. Poltava Provincial Agricultural Experimental Station. Corn, about 75 bushels per acre. L. to R. Bulik, Melnikov, and Khereprest.

K-2647. July 29, 1958. Near Poltava. Poltava Provincial
Agricultural Experimental Station. Corn, about
75 bushels per acre. In to R. Bulik, Melnikov,
and Kharovsk.

4. Corn or sugarbeets
5. A spring crop: barley, oats, buckwheat, or millet
6. Corn for harvest at dough or milk stage
7. Winter wheat or rye
8. Corn (for grain) or sugarbeets
9. Spring cereal
10. Winter wheat

On the basis of their experiments they think that one year in 9 or 10 in grass is enough on collective farms. This may be true for nearly level land, but I should hardly think so for the sloping land. Yet the corn for grain here looks good. They claim 70 bushels per acre on a 5-year average. While taking pictures here Mr. Khereprest tells us that he will go with us during the remainder of our stay in the Ukraine. He seems like quite a good agriculturist.

We then go by a Memorial of Glory commemorating the victory over the Swedish King, Charles XII by Peter the Great in 1709. The present statue was built in 1809. The site is in a nice park with good formal gardens.

We return to the hotel, pack and go to the restaurant. As usual, the meal is slow and we don't get to leave until 3:20 p.m.

About 32 kilometers southeast of Poltava, I look at a Chernozem said to be transitional between thick and ordinary Chernozem. The soil is formed from loess on the third terrace above the Dnepr River. The plain is very gently undulating.

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A _{1p}	0 - 12"	Black silty clay loam with fine granular structure; many fine roots; friable. In upper part, pH is 6.4; in lower part 6.9. Gradual boundary.
A ₁₂	12 - 22"	Black to very dark gray (10YR 2/1 to 3/1) silty clay loam with mixed medium granular, fine angular blocky, and fine subangular blocky. The pH is 6.9. Friable; gradual boundary.
A ₃₁	22 - 35	Very dark grayish-brown (10YR 3/2) silty clay loam. Fine rounded blocky to very coarse granular with slight vertical breakage of whole mass. Many worm holes and casts; friable; gradual boundary.
A ₃₂	35 - 38 ⁺⁴	(Transitional). Dark grayish-brown (10YR 4/2) silty clay loam. Many krotovinas.
B ₂ C ²	or 38 - 54+	Brown (10YR 5/3) silty clay loam. Weak, fine subangular blocky to massive in place but digs out in weak irregular blocky that is easily friable (pH 7.1) <u>a/</u>

This does not appear to be a very old soil. But from what I have learned, I gather that all chernozemic soils in the Soviet Union have less evidence of a clay accumulation in B position than do those in the United States that are still called zonal soils.

a/ pH determinations by field meter.

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Black to very dark gray (10YR 2/1 to 3/1) silty clay loam with mixed medium granular, fine angular blocky, and fine subangular blocky. The pH is 6.9. Friable; gradual boundary.	A₁₂ 12 - 32"
Very dark grayish-brown (10YR 3/2) silty clay loam. Fine rounded blocky to very coarse granular with slight vertical breakage of whole mass. Many worm holes and casts; friable; gradual boundary.	A₃₁ 32 - 35"
(Transitional). Dark grayish-brown (10YR 4/2) silty clay loam. Many root channels.	A₃₂ 35 - 38 1/4"
Brown (10YR 5/3) silty clay loam. Weak, fine subangular blocky to massive in place but dig out in weak irregular blocky that is easily friable (pH 7.1) a/	B₃ or B₂ - 38 - 54 +"

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a/ pH determinations by field meter.



K-2648. July 29, 1958. 32 km. southeast of Poltava.
Shelterbelt on Chernozem: Four rows of trees,
mostly maples, oaks, elms, and locust, with two
shrub rows.



K-2546. July 29, 1958. 32 km. east of Poltava.
End of young shelterbelt on Chernozem.
Seven rows: locust, oak, ash, maple,
and others.

K-2648. July 29, 1958. 32 km. southeast of Poltava.
Belted on Chernozem: Four rows of trees,
mostly maples, oaks, elms, and larches, with two
third rows.

VII-2

K-2548. July 29, 1958. 32 km. east of Poltava.
End of young belt on Chernozem:
Seven rows: larch, oak, elm, maple,
and others.

The profile is examined in a field from which a cereal grain has been harvested and alfalfa seeded. Nearby I see corn used as a nurse crop for alfalfa. (K-2648) This field is surrounded with well-grown, but young shelterbelts. There are 4 rows of trees on some of them with maples, elm, oak and locust plus outside shrub rows. At another margin there are 7 rows of trees including locust, yellow acacia, oak, ash, and maple. (K-2546) Some pears and wild apples are included.

We leave at 4:55 p.m., along the road to Kharkov. Mr. Taran will leave us at the oblast boundary.

At 5:25 p.m. we leave the Poltavskaya Oblast and enter the Kharkovskaya Oblast. The soils are mostly Chernozem with some patches of forest on the distant slopes. I see corn, wheat (most fields are already harvested), sunflowers, fallow, millet, and sugarbeets. The crops look good, but those in the family plots are better. I see many straw stacks in the fields. There are relatively few shelterbelts, although one is rarely out of sight of some.

Gully control is mainly a matter of protective plantings of grasses and trees. Structures are needed only in extreme situations; but I see a few bad gullies along the streambanks that lack needed structures.

We pass a nice young apple orchard, underplanted with buckwheat, on sloping Chernozem. The houses of collective farmers along here seem a bit better than those west of Poltava. Again I see gullies on some strong slopes needing diversion terraces.

The profile is examined in a field from which a cereal grain has been harvested and alfalfa seeded. Nearby I see corn used as a nurse crop for alfalfa. (K-2543) This field is surrounded with well-grown, but young shelterbelts. There are 4 rows of trees on some of them with maples, elm, oak and locust plus outside shrub rows. At another margin there are 7 rows of trees including locust, yellow acacia, oak, ash, and maple. (K-2544) Some pears and wild apples are included.

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We pass a large state farm with a big poultry plant in addition to the usual crops.

Along the next ravine I see forest and shrub plantings in strips for erosion control.

As we approach Kharkov there are many orchards on rolling Chernozem and some fish ponds. I see a few large gullies that have been stabilized by protective grass. My guide speaks of "war erosion" in areas that were badly shelled and dug up for trenches.

We pass a special station for agricultural aircraft, hired by collectives for spraying orchards, spreading fertilizers, etc. It is a pity that the country roads are so wet that we have to go around by way of Kharkov.

Yields here seem good, perhaps 75 percent of those of the United States on similar soils. Actually, I have no satisfactory basis for comparison. But obviously labor income on farms is low. These farms have far too much labor and here there is a curious mixture of the most modern methods and of "made work" in order to give people some labor-day units. The hand cutting of green fodder and the hauling of it in little horse-drawn carts are examples. It is the old story of getting more factories for making consumer goods to use the excess labor on farms.

At 6:30 we reach the suburbs of Kharkov and turn left for the main road to Dnepropetrovsk.

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I see orchards, mainly apples, but with some pears and plums, on sloping Degraded or oromorphic Chernozems. In these suburbs people have small fruit and vegetable gardens. We turn southeast on the main road at 6:36. Almost immediately I see two more old gullies, not fully stabilized and needing engineering structures.

We are soon out of the fruit area and see meadows, corn, wheat, and new fallow. There are some clumps of natural trees from the original spots of forest and a few shelterbelts. Later we pass through a natural forest. Most of the trees are oaks about 6 - 12 inches dbh. I pass some more of these oak forests.

About 70 kilometers south of Kharkov I note sugarbeets, recent fallow, wheat being harvested, millet, corn, sunflowers, and some small orchards. There are some more strong slopes with bad stringer gullies that need attention. The wonder is that erosion is not worse. Part of the road along here has such high hedges that I can scarcely see the crops. We pass through Krasnograd at 7:43 p.m. The side roads appear to be impassable. As we go on south we see small clumps of naturally growing trees and more windbreaks, especially along the road for snow control but also along the field boundaries.

I ask my guide why the crops are so much better in the individual plots than elsewhere on the farm. He tells me that this is because the farm family have all the manure from their own cow, pig, and poultry! Obviously, it is mainly a matter of incentive.

I see orchards, mainly apples, but with some pears and pines, on sloping degraded or eroded Chernozems. In these suburbs people have small fruit and vegetable gardens. We turn southeast on the main road at 6:36. Almost immediately I see two more old gullies, not fully stabilized and needing engineering structures. We are soon out of the fruit area and see meadows, corn, wheat, and new fallow. There are some clumps of natural trees from the original spots of forest and a few shelterbelts. Later we pass through a natural forest. Most of the trees are oaks about 6 - 12 inches dbh. I pass some more of these oak forests. About 70 kilometers south of Kharkov I note significant, recent fallow, wheat being harvested, millet, corn, sunflowers, and some small orchards. There are some more strong slopes with bad steeper gullies that need attention. The wonder is that erosion is not worse. Part of the road along here has such high hedges that I can scarcely see the crops. We pass through Kravnyy at 7:43 p.m. The side roads appear to be impassable. As we go on south we see small clumps of naturally growing trees and more windbreaks, especially along the road for snow control but also along the field boundaries. I ask my guide why the crops are so much better in the individual plots than elsewhere on the farm. He tells me that this is because the farm family have all the manure from their own cow, pig, and poultry! Obviously, it is mainly a matter of incentive.

As we reach the boundary of the Dnepropetrovskaya Oblast we are met by a delegation from that oblast office. It is now 8:20 p.m., and we have 90 kilometers to go. So we shall be late to bed again. After we pass the Orel River it is too dark to see.

We are taken to the Ukraina Hotel. All of us are very tired. Then again a late supper. This seems to be a nice hotel, but I have a front room on a noisy street. To bed at midnight.

As we reach the boundary of the Dnepropetrovsk Oblast

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There again a late supper. This seems to be a nice hotel, but I

have a front room on a noisy street. To bed at midnight.

July 30

I am up at 7 a.m. and go out for a walk. It is warm and sunny, but hazy. The stores do not have any first-class goods. Glass, hats, jewelry, and the like are rather poor. Radios are priced at from 300 to 900 rubles, bicycles at about 600 to 700 rubles, moderately small vacuum cleaners at 400 to 450 rubles, etc. As usual, the book stores have mainly scientific and technical books with many windows for chemistry, metallurgy, agriculture, and so on. One show window is for books on Lenin and another for all literature. I notice here that there are fairly long lines at each of the food stores.

In contrast to 1945, one now sees many fat people, especially women past middle age. Many of the people appear to me to be tired, not hungry or otherwise physically distressed, just plain tired.

Here in the USSR the large public buildings of all sorts seem to take the place of the old cathedrals as an escape from poor houses and apartments.

We have breakfast at 8 and are in the cars at 9 for a visit to farms south of the town and west of the river. This town does not impress me as being as clean and gay as Kiev. There is more industry. Near the city limits there is considerable unused and poorly kept land (probably not being held by speculators!) I see shelterbelts along the highway and crops as follows: corn, fallow, wheat, fallow, hay, corn, fruit, and sunflowers.

July 30

I am up at 7 a.m. and go out for a walk. It is warm and sunny, but heavy. The stores do not have any first-class goods. Glass, hats, jewelry, and the like are rather poor. Radios are priced at from 300 to 500 rubles, bicycles at about 600 to 700 rubles, moderately small vacuum cleaners at 400 to 450 rubles, etc. As usual, the book stores have mainly scientific and technical books with many windows for chemistry, metallurgy, agriculture, and so on. One show window is for books on Lenin and another for all literature. I notice here that there are fairly long lines at each of the food stores. In contrast to 1945, one now sees many fat people, especially women past middle age. Many of the people appear to me to be tired, not hungry or otherwise physically distressed, just plain tired. Here in the USSR the large public buildings of all sorts seem to take the place of the old cathedrals as an escape from poor houses and apartments. We have breakfast at 8 and are in the cars at 9 for a visit to farms south of the town and west of the river. This town does not impress me as being as clean and gay as Kiev. There is more industry. Near the city limits there is considerable unused and poorly kept land (probably not being held by speculators!) I see wheatfields along the highway and crops as follows: corn, fallow, wheat, fallow, hay, corn, fruit, and sunflowers.

On slopes of 20 percent there are deep gullies but no attempt at control. The soils are dark brown and are locally called leached Chernozem.

I am told that when a city wants to expand over the land of a collective farm, the farmers must agree to it! If a state farm is nearby the collective farm is given land from the state farm. But if no land is available, the matter is discussed. Usually the collective agrees, but they get no compensation. (I just cannot believe it is this simple and straight forward.) We drive on. There is more cereal stubble being plowed and more corn. Most of the dark soil is undulating but near the streams it is a medium brown rather than black, possibly from erosion. As we go along I note fallow, sunflowers, corn, wheat, orchards, cereals (mostly winter wheat), fallow, meadow-pasture, and sunflowers. One sees people grazing a few cows along the road. This may be made work or it may be individual family cows herded by grandmother, often accompanied by the children.

We turn right a bit on the main road to Nikopol. Here we have huge fields of sunflowers, fallow, corn, fallow after cereals, and wheat. I notice some burning of heavy wheat stubble in advance of plowing. Then again corn, sunflowers, weedy meadow-pasture with dairy cows, corn, meadow-pasture with dairy cows, fallow, sunflowers, a seed crop of sudan grass or millet, sunflowers, corn, fallow, and small grain.

On slopes of 30 percent there are deep gullies but no attempt at control. The soils are dark brown and are locally called lashed

Chernozem.

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The Chernozem soil here is a bit on the dry side. I pass corn, fallow, corn, and new fallow. Now workers in the field are pulling little piles of straw into stacks. I am told that wheat here runs about 3.5 tons per hectare. Again I see fallow and corn. Most of this corn will run from about 35 to 45 bushels per acre. Then we have sunflowers, wheat, fallow, wheat, sunflowers, fallow, wheat, corn, grass seed, wheat, corn, fallow, corn, fallow, and wheat.

Most of the villages seemed to be at considerable distance from the road. I see some windbreaks that are rather thin and narrow. Here, too, most farm homes are small and rectangular and have white-washed walls and thatched roofs. The landscape suggests increasing dryness as if tending toward the Reddish Chestnuts. Generally, the soil is more sloping. I see some man-made ponds within the villages. Here the individual plots have much corn and sunflowers.

Going back to the crops we have fallow, corn, a mulberry planting, corn, fallow, wheat, meadow, fallow, weedy meadow, mulberries as shrubs, corn, grazing cattle on corn, fallow, corn, sunflowers, wheat, meadow-pasture with dairy cattle, wheat, sunflowers, corn, and fallow.

Here again I see many of these old watching hills some 12 to 15 feet high and roughly 100 feet long and 60 feet wide. We make a sharp turn toward the river. I see some grapes, cabbage, cucumbers, pasture with dairy cattle, orchards, vineyards, corn, a young orchard, and some cereal, all without irrigation except for the cucumbers so far as I can see.

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Then we have sunflowers, wheat, fallow, wheat, sunflowers, fallow,

wheat, corn, grass seed, wheat, corn, fallow, corn, fallow, and

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Here the individual plots have much corn and sunflowers.

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corn, fallow, wheat, meadow, fallow, weedy meadow, mulberries as shrubs,

corn, grazing cattle on corn, fallow, corn, sunflowers, wheat, meadow-

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Here again I see many of these old watching hills some 12 to 15

feet high and roughly 100 feet long and 60 feet wide. We make a sharp

turn toward the river. I see some grapes, cabbage, cucumbers, pasture

with dairy cattle, orchards, vineyards, corn, a young orchard, and

some cereal, all without irrigation except for the cucumbers so far

as I can see.

We cross a small ravine with gullied slopes partially stabilized by grass. We pass a small mine.

At 10:55 we come to the Orzhonikidze Collective Farm. I meet Mr. Gordienko, the chairman. Here, too, is a blaring loud speaker at the entrance to the office. Besides the headquarters there are three other villages.

We go into the chairman's office and he speaks to us. The farm is now organized into 5 field and tractor brigades. At first only 50 farmers were grouped together in this collective. He says the combination was obviously beneficial. They are equipped with machinery. Now there are 560 families on 7,000 hectares. I note that the rainfall here is 350 millimeters. The roofs of some of the houses are thatch, but are rapidly being changed to metal. He tells us he now has the following machines:

28 tractors

29 trucks

1 car

24 combine harvesters

62 engines and motors

All the farm is electrified and mechanized, including the livestock enterprise.

He tells us that before the Revolution grain yields were about 0.5 ton per hectare; now they are 2.5 tons per hectare. Corn for grain yields 4 tons per hectare. Winter wheat is the main grain crop,

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machinery. Now there are 500 families or 7,000 hectares. I note

that the rainfall here is 350 millimeters. The roofs of some of the

houses are thatch, but are rapidly being changed to metal. He tells

us he now has the following machines:

38 tractors

29 trucks

1 car

24 combine harvesters

63 engines and motors

All the farm is electrified and mechanized, including the livestock

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grain yields 4 tons per hectare. Winter wheat is the main grain crop.

2,500 hectares, not irrigated. The average yield is 2.2 tons per hectare. They use superphosphate, potassium, and some local by-products. They have 300 hectares of irrigated orchard newly planted, besides the old orchards. The livestock includes 700 milk cows, 2,000 pigs, and 13,000 chickens and other poultry. They grow some vegetables. He tells me that they get 5 million rubles from the orchards and a total income of 12 million. He had 650 workers plus young people who work during the school vacation. He has enough labor; but then he admits he could get along with 500. (Of course he doesn't need this many.) All the buildings were destroyed by the Germans and the present ones were constructed after the war.

The agronomist shows a soil map made this year by the Institute in Dnepropetrovsk at a scale of 1:25,000. The map shows 9 units in all including ordinary Chernozem, slightly eroded Chernozem, meadow Chernozem, strongly eroded Chernozem, and local Alluvial soils.

They tell me that they have a 12-year crop rotation about as follows:

1. Fallow
2. Winter wheat
3. Corn for grain
4. Corn for silage
5. Winter wheat
6. Sunflowers
7. Fallow
8. Winter wheat
9. Winter wheat

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follows:

1. Yellow

2. Winter wheat

3. Corn for grain

4. Corn for silage

5. Winter wheat

6. Sunflowers

7. Yellow

8. Winter wheat

9. Winter wheat

10. Row crop, corn or melons
11. Spring barley or oats
12. Annual grass, especially sudan

They also have a special rotation for fodder crops including 600 hectares for roots (mangel-wurzels) for cattle. He says they have two of these 12-year rotations yet I doubt very much that they follow them closely even though they may be in the farm plan. The fields of the farm are nearly the same size.

The fruits are graded and packed on the farm and delivered to the towns nearby. They also have vineyards and forest strips for shelter and for erosion control.

He says that 13 members graduated from an agricultural institute. He has graduate officers for field crops, for horticulture, and for animal husbandry.

We take a look at the carpenter shop which has only moderately good circular power saws and other power equipment. He says that previously they had one machine and tractor station for 6 farms but three of the farms were combined into this one. He takes us to a new grain storage structure that looks very good to me. I see several new houses that are very nice, the best I have seen on a collective farm. (K-2649) Many of the others are not very good, but they claim to have a plan to rebuild all of them.

We go out into a corn field. They expect 3 tons to the hectare and may make it. I notice that the corn is planted in check rows but still has not been cross cultivated. The corn is planted in early May and harvested in the middle of September. Some is now being harvested for silage.

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12. Annual grass, especially sudan

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K-2649. July 30, 1958. Dnepropetrovsk. New housing on
Orzhonikidze Collective Farm.

K-2640. July 30, 1958. Dnepropetrovsk. New housing on
Orbentzinskaya Collective Farm.

Sunflowers are from waist high to head high and they expect 1.8 to 2.0 tons per hectare with 28 to 30 percent oil. They sell the seeds at 150 rubles per centner. They use a special combine harvester that threshes out the seed. Some new varieties under test have 50 to 54 percent oil and there is a promising one just developed and under test that runs up to 73 percent oil. Cut early, sunflowers make good silage. The stalks of mature sunflowers are burned and the ash used as a potassium fertilizer. When they sell the sunflower seeds to the government they are given back the cake free for animal feed.

Clearly this farm has plowed much of its income back into the farm. I get the impression that these people are anxious for peace and a chance now to enjoy some of the advantages from their hard work and their savings.

Here, too, I see some of the old watching hills. Some of them have wooden towers for triangulation stations some 25 feet high.

We go to the orchard and vegetable area. The farm is cut by a narrow swampy area that is being reclaimed. The drainage water is pumped from the ditches into the lake back of the dam. The soil will be used for irrigated vegetables.

The orchard on a moderate side slope is sodded and irrigated. They have a little circular bund that makes a basin around every tree about 6 to 8 feet across. (K-2547) I also see irrigated grapes. We are taken into a large grading and packing shed that cares for 1,500 tons of fruit, mainly apples and pears, from 120 hectares. Other land is newly planted to orchard. There are many gaps in the old orchard caused by war destruction from a battle here.

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K-2547. July 30, 1958. Near Dnepropetrovsk.
On Orzhonikidze Collective Farm. Sodded,
irrigated orchard with cultivation around
trees. (Chernozem).

K-2547

IV

K-2547. July 30, 1958. Near Dnepropetrovsk.
On Orshonikidze Collective Farm. Soded.
Irrigated orchard with cultivation around
trees. (Chernozem).

These are now filled with younger trees. All of the peach trees were destroyed by the Germans and they plan to restore them soon.

The sod under the orchards is mowed. They use phosphorus, nitrogen, and potassium for fertilizers. An application of night soil is put on in the spring with the irrigation water.

I am told that they have 29 varieties of apples, pears, walnuts, and plums. I notice at least one separation of the orchard by a narrow road lined with very tall poplar trees.

The chairman gives me some apples harvested last autumn and stored till now. These are a moderate-sized, yellow apple called "champagne." I tell him that it is the best apple I have ever tasted. He asks for my name and address so he may send me a box of them next autumn!

The water distributing system is a bit crude and I doubt that the control is adequate. In places I believe the yield could be increased substantially. But in other places the crop is very good. Each plot is about 5 hectares and the most of them are bordered by English walnuts. As we go on through the orchard I see some excellent apple and pear trees. The apples are delivered to the government and they get 2.5 rubles per kilogram for the normal ones and 1.5 rubles per kilogram for the small ones. For the good apples stored and sold out of season, they get 5 rubles per kilogram. I am told that some of the good trees I am looking at produce 500 kilograms of apples and I can believe it. These are sprayed 5 or 6 times annually.

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and 1.5 rubles per kilogram for the small ones. For the good apples

stored and sold out of season, they get 5 rubles per kilogram. I am told

that some of the good trees I am looking at produce 500 kilograms of apples

and I can believe it. These are sprayed 2 or 3 times annually.

The orchard is not perfect, but on the whole it is a very good one.

Then we go to lunch at tables set up in the orchard. Of course, there are many fine speeches but all in all it is very pleasant. This is the first of these kinds of banquets that I have really enjoyed.

After lunch we are driven to a good-sized boat in order to cross the Kakhov water reservoir. We leave at 3:30 in order to see a state farm where they plan to irrigate a large area from this new "freshwater sea," really a lake. They told me that 2,900,000 hectares were already irrigated in this general region. That seems like a pretty big figure. The Chief of the Harbor comes with us, which is quite an honor. He is ^a kind of Russian Wallace Beery!! He is a good singer and gets nearly everyone else singing.

As we arrive at the state farm hundreds of people are there to see us. We go through the crowd into a little bus and go over one of the roughest cobble stone roads I have ever been on. I see vegetables, corn, potatoes, hybrid corn seed and sugarbeets.

We are now on the Dneprovski State Farm which was organized in 1926. It has 18,000 hectares with 6,000 already irrigated. The main income comes from milk and 1,400 hectares of vegetables and amounts to 7,200,000 rubles. They produce early vegetables and vegetable seeds.

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of the roughest cobble stone roads I have ever been on. I see

vegetables, corn, potatoes, hybrid corn seed and sugarbeets.

We are now on the Bneprovski State Farm which was organized in

1936. It has 18,000 hectares with 6,000 already irrigated. The main

income comes from milk and 1,400 hectares of vegetables and amounts

to 7,500,000 rubles. They produce early vegetables and vegetable

seeds.

We are taken to a field of a chernozemic Alluvial soil near the river that is being leveled for irrigation. My guide insists that this is an old terrace and the soil is an ordinary Chernozem. (Privately, I think it is a fairly young terrace.)

They are making cuts here of 10 to 15 cm. up to a maximum of 25. I think this demonstration is being put on for us. (K-2548 and 49) They are using caterpillar tractors with large dump scrapers and a leveling machine that is a bit too small for the best results.

We drive on and I see some Red Steppe dual-purpose cattle. For the first time I see a shelterbelt spoiled by grazing. (Added later: This is the only one I saw. We have a great many so spoiled in the Great Plains.) We pass a young vineyard and they take us to the pumping station of this irrigated area. They can furnish water to about 10,590 hectares. Our lecturer gives us a lot of discussion about the number of drop siphons and all the rest. I don't see anything especially remarkable. He says they can lift 5,200 liters per second.

We go to a field being irrigated by a very strong spray pump operated by power take-off from a large caterpillar tractor. The field has eggplant and tomatoes.

We are then taken to an opening within an old wide shelterbelt for supper. This is another big one with lots to eat and drink and the usual toasts. I try to say something different at each of these,

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K-2548. July 30, 1958. Near Dnepropetrovsk.
Dneprovski State Farm. Land leveling.



K-2549. Near Dnepropetrovsk. Dneprovski State Farm.
(another view).

K-2548

IV

K-2548. July 30, 1958. Near Dnepropetrovsk.
Dneprovsk State Farm. Land leveling.

K-2549

III

K-2549. Near Dnepropetrovsk. Dneprovsk State Farm.
(another view).

but I fear that I shall run out of soap before we get back to Moscow.

Then we get into the shaky bus and go back over this terrible cobble-stone road to the lake and onto the boat at 8:45.

The crossing is nice and we reach Nikopol at 9:30. Now the long, long ride back to the hotel in the dark until 11:40 p.m. This has been an interesting day but a very tiring one.

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Moscow.

Then we get into the shaky bus and go back over this terrible

cobble-stone road to the lake and once the boat at 8:45.

The crossing is nice and we reach Wikipoi at 9:30. Now the

long, long ride back to the hotel in the dark until 11:40 p.m. This

has been an interesting day but a very tiring one.

July 31

My hotel is too noisy to sleep after 6 a.m. when the street-cars begin their screeching. I pack some of my things. No tea is served in the rooms! It is already sunny and warm in the streets.

Until now I hadn't realized how bad the road system is in this country. Even the main black-top roads are not real good; and the earth roads are very bad. Most of the roads to the farms are neither graded nor drained. They are very dusty in dry weather and very muddy in wet weather. As the dust blows out and the mud spatters, they gradually sink into the landscape, which makes matters worse.

After breakfast our local hosts come at 10:05 and they say that both the farmers' market and the art museum are closed. At 10:15 we leave for the corn-breeding institute.

In this city, as elsewhere, the main effort, up to now, toward improvement is along the main streets. The back streets and the buildings on them are rather shabby.

We come to the All-Union Scientific Research Institute on Corn. This is under the Lenin Academy of Agricultural Sciences in Moscow.

Our hosts point out that the large expansion of corn growing in the USSR for grain and fodder requires a large expansion of research for seed selection, mechanization, agro-technical methods, pest and disease control, economic evaluation, etc.

The Institute was founded in March 1956 on the basis of a Grain Research Institute, started in 1930. The old institute dealt with the problems of the forest-steppe zone. The research of that zonal

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institute is being continued but the program now considers the whole Soviet Union. The present Institute inherited many experimental stations and now has 15 such stations with a total of 15,000 hectares. They have an experimental farm about 45 km. from Dnepropetrovsk and there are others in the other republics.

The Institute hopes to increase corn production and farm productivity. They are working on organic, mineral, and bacterial fertilizers for corn and other crops. They are trying to reduce labor requirements. They cooperate with collective and state farms for large scale trials involving 60,000 hectares. These trials show that if corn producers were to have enough machines and labor they could produce 100 hectares of corn with 19 or 20 man-hours. (Added later: This must be for one hectare) Actually a tractor driver and his assistant can cultivate 200 hectares of corn for either grain or silage. So they select machines best suited for 200 hectares. They call this group a machine aggregate, complex, or set. In 1958 in this Oblast they had 1,116 such machine complexes for growing corn on 200 hectares.

The corn is planted by the check-row method. Much of the labor cost was for thinning. Their present machines control the rate of sowing and the kernels per hill. They use a tractor-mounted cultivator and a special combine harvester or two-row picker (KU-2 and KU-2A). The machine picks the ears and chops the stover either for silage or to plow down. The picked ears are collected by dump trucks or tractor-drawn tip wagons.

institute is being continued but the program now considers the whole Soviet Union. The present institute inherited many experimental stations and now has 15 such stations with a total of 12,000 hectares. They have an experimental farm about 42 km. from Dnepropetrovsk and there are others in the other republics. The institute hopes to increase corn production and labor

productivity. They are working on organic, mineral, and bacterial fertilizers for corn and other crops. They are trying to reduce labor requirements. They cooperate with collective and state farms for large scale trials involving 60,000 hectares. These trials show that 15 corn producers were to have enough machines and labor they could produce 100 hectares of corn with 12 or 10 man-hours. (Added later: This must be for one hectare) Actually a tractor driver and his assistant can cultivate 200 hectares of corn for either grain or silage. So they select machines best suited for 200 hectares. They call this group a machine aggregate, complex, or est. In 1958 in this Oblast they had 1,116 such machine complexes for growing corn on 200 hectares.

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This complex brigade for two laborers has the following:

1 wheeled tractor

1 check-row planter, usually the trail type but some
are tractor mounted

1 cultivator

1 or 2 corn pickers

1 silage-making harvester for 4 rows

With this equipment two men could grow corn on 100 or 150 hectares for either grain or silage. To stimulate work these brigades are given bonuses.

(Obviously I'm not getting an entirely consistent story.)

Planting and harrowing are done separately but not by these two men. Plowing is done by crawler tractors. Most use five-bottom plows for a strip 1.75 meters wide but some use ten-bottom plows. Normally they plow in the fall. In the spring they harrow once and give two cultivations before planting, although in wet springs they harrow 2 or 3 times. A spike-tooth harrow follows the cultivators the last time after the seedbed is prepared before planting. After the corn is up they cultivate twice along the rows and twice across them. Occasionally they use the spike-toothed harrow just as the corn comes out of the ground. They are trying to reduce cultivation (which they certainly could do with weed killers.) Sometimes they use a disk to cut the stubble after harvest and before plowing.

Now I am told that it takes 20 man-hours per hectare, including the first operation but not corn shelling. This was their best experiment, the poorest took 34 hours. Experiments on collective farms showed 47 man-hours per hectare, including the shelling.

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1 wheeled tractor

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1 silage-making harvester for 4 rows

With this equipment two men could grow corn on 100 or 120

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ment, the poorest took 34 hours. Experiments on collective farms showed

47 man-hours per hectare, including the shelling.

(I'm convinced that these are highly theoretical and that there is no such labor efficiency on the actual farms.)

For grain I'm told that at the station one man-hour produces 100 kilograms of corn. Thus, they say, by using the improved methods the output per man-hour can be increased by 5 or 6 times over recently current practices. These methods also are said to reduce the number of tractor hours by about 20 percent. One farm laborer can handle 100 hectares except for harvesting. (These are certainly theoretical figures and do not include periods of bad weather, breakdowns, and all the rest.)

They are also studying ways of controlling diseases and weeds and of how to dry and store seed corn. Crops used in the rotations are also under study, including winter wheat, spring cereals, oil bearing crops, soybeans, lentils, other pulses, fodder crops, sorghum, sudan grass, millet, etc.

The pedology laboratory here studies ways to improve Solonchak and Solonetz to make them suitable for these crops.

I ask whether they have methods for mono-culture of corn. They reply that they are now interested and expect to start research next year.

They usually recommend 30 to 45 kilograms per hectare of nitrogen for corn. On Chernozem they apply the fertilizers a little below and a little to the side of the seeds, which are in hills. Their research includes P, K, N, and the trace nutrients. On Chernozem phosphorus is very important. Even 25 kilograms per hectare gives good results and only 5 kilograms will show response. They like to use granular

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and only 5 kilograms will show response. They like to use granular

superphosphate. Nitrogen is applied at the same time or later in May or June as a side dressing. But side dressings of nitrogen give no result on Chernozem in dry years.

They use farmyard manure most commonly on winter wheat but some goes on corn.

They claim good results from the use of phospho-bacterin applied to the seeds. They claim that azotobacter is effective in moist years on soils well supplied with phosphorus.

Foliar sprays are not effective here but are further north.

They tell us something about their plans for 1960. They hope to have 28,000,000 hectares of corn in the USSR. In 1957 they had 24,000,000 hectares.

Here in this Oblast 536,000 hectares are in corn - of this 50,000 for green fodder, 216,000 for grain, and 280,000 for silage. (The squirrels must have brought in 10,000 hectares.)

On an average for the USSR, their targets for 1960 are 2.5 tons of grain per hectare and 30 tons of silage per hectare.

We make short visits to the laboratories of plant pathology and agro-chemistry, where they are studying the usual things. Some of their experiments were begun in 1910. Previously they had thought that only phosphorus was needed for corn on Chernozem, but as the phosphorus is built up they note first nitrogen deficiency and then potassium deficiency. In fact, the long time use of phosphorus occasionally gave depressed results. I am well impressed with their agro-chemical program.

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We hurry back to the hotel, pack, and leave for the airport at 1:15 p.m. On the way we pass two watching hills some 20 feet high.

We reach the airport at 1:30 and wait and wait. Our plane was scheduled as a special flight. A storm at Kiev has interrupted the radio so, as of 3:25 p.m., I don't know when, as, or if we shall leave for Rostov.

I have some long talks with our hosts (especially V. P. Osadchin, assistant director of the agricultural administration of the local Oblast) about this and that. We talk quite a bit about overemployment on farms and the plans for using the periods of unemployment during the winter. I am told that a few oblasts in the USSR have significant cottage industries but certainly not many.

Finally the plane comes at 5:15 and the wheels are up for Rostov at 5:25.

Near the river the sides of the natural ravines are cut by new accelerated gullies. The soil appears to be Chernozem. The crops are mainly cereals, meadow, fallow, and corn. (It is too hazy to see clearly). There are a few shelterbelts.

Most villages have their houses in line along the road, sometimes in single rows and sometimes double.

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As elsewhere, the private plots stand out clearly.

These Ukrainian people are certainly friendly and I feel genuinely so. It is truly remarkable how they have rebuilt their burned out cities and villages; and how they have recovered their spirit after the horrible German occupation and terror.

Further on I see an escarpment with bad gullies in the fields but these are fully controlled where there are private plots on the escarpment, so the peasants know how to do it. Yet aside from these narrow strips of moderately gullied land on the terrace escarpments there is exceedingly little wasteland. I see fallow, corn, wheat, and sunflowers.

We are down at Stalino at 6:12 p.m. and leave at 6:55. At the margin of the city I see small plots or allotments used by apartment dwellers for individual fruit and vegetable gardens. In the newest subdivisions, there seem to be many individual houses with such gardens.

Near the river I see some deeply trenched, small water courses with eroding slopes. In places there are many gullies but no check dams or diversions. Unsuccessful attempts are being made to protect these slopes with grass cover and with irregular tree plantings on the cut banks. Simple contouring with strips would protect many of the slopes.

At 7:10 p.m. we are over rolling land of which a little is farmed in the favored places. Here I see the most serious erosion since I have been in the USSR. But in 3 or 4 minutes we are again over cultivated soil.

About halfway to Rostov from Stalino I see Chernozem with good crops of wheat, corn, sunflowers, orchards, etc. I see a few big deep round grassed holes, which may be old shell holes. Then we pass over more of these small deeply trenched streams with eroding slopes; but they are widely spaced. Then some more of these holes. Near Rostov I see a small airfield with protecting embankments along with considerable unidentified equipment.

We are down in Rostov at 7:30 p.m. and by 8:00 we are in the cars for the city. I am told that the central part of the city was completely destroyed by the Germans. The city has a great "green belt" of trees around it. These include acacia, ash, maple, and others. Within the belt are special tree farms for forestry work.

We arrive at the Don Hotel at 8:45 and discuss our plans with our hosts. We agree on one lecture, one state farm, and one collective farm. Our hosts can see that we are nearly exhausted, and, praise the Lord, there is no banquet.

I go down to dinner with the others. I am so tired and the waiters are so slow that I give it up, take a bath, and go to bed.

During our stay in Rostov, we have several meetings with our hosts. A reasonably complete list follows:

Southern State Institute for Designing Water Economy:
Yuzhgiprovdokhoz, in Rostov

1. From Yuzhgiprovdokhoz:

1. Director of the Institute - Ovchinnikov, A. A.
2. Vice Chief Engineer - Malinovskii, P. I.
3. Head of Topographical Survey Section - Gorskii, M. M.
4. Head of Soil-Melioration Section - Konovalov, N. M.

About halfway to Krasov from Stalin I see Chertomukhin with good crops of wheat, corn, sunflowers, orchards, etc. I see a few big deep round grassed holes, which may be old shell holes. Then we pass over more of these small deeply craters with eroding slopes; but they are widely spaced. Then some more of these holes. Near Krasov I see a small airfield with protecting embankments along with considerable unidentified equipment.

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Southern State Institute for Designing Water Economy;
Yuzhnoye, in Krasov

1. From Yuzhnoye:

1. Director of the Institute - Ovchinnikov, A. A.
2. Vice Chief Engineer - Malinovsky, P. I.
3. Head of Topographical Survey Section - Gorkov, M. M.
4. Head of Soil-Reclamation Section - Kozlov, K. M.

5. Chief Engineer of Project - Melodiev, G. S.
6. Chief Engineer of Project - Shtepa, B. G.
7. Head of Technical Section - Loshchilov, M. A.
8. Senior Engineer - Simontovskaya, K. I.

2. Invited Guests:

1. Head of the Oblast Administration of Water Economy -
Rybchevskii, V. S.
2. Director of Yuzniggima (Southern Scientific-Research Institute
for Hydrotechnique and Melioration) - Litvintsev
3. Vice Head of Oblast Administration of Agriculture - Tidzhiev
4. Head of Oblast Section of Land Utilization - Fokin
5. Head of Soils for Oblast Administration of Land Utilization -
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- 5. Chief Engineer of Project - Melnikov, G. S.
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- 3. Vice Head of Oblast Administration of Agriculture - Tishchenko
- 4. Head of Oblast Section of Land Utilization - Boris
- 5. Head of Soil for Oblast Administration of Land Utilization - Fedyanov.

August 1

This bright sunny morning promises a hot day. I take a short walk. Here, too, the pigeons are feeding along the street. Some good Party member must have been to Venice! The pavements in the side streets are pretty bad. We go to breakfast at 7 a.m.

The cars come at 8:02 and take us to the Southern State Institute for Designing Water Economy. Here they have a beautiful table all set with flowers, fruit, meat, wine, and cognac. The conference is attended by the Director of the Institute, the Chief of Water Economy for the Oblast, the Director of the Southern Institute on Hydro-technique, the Chief of Agricultural Administration in the Oblast, the Chief of the Section on Agricultural Land Utilization, the Chief for Soil Investigations, and others.

First of all, we are given a general statement about the Rostovaskaya Oblast. The total area is said to be 10,500,000 hectares. There are 180 state farms and 383 collective farms. They vary in size from 5,000 to 50,000 hectares with an average of 13,000. Compared to other places, this is a high proportion of state farms. The rainfall is said to be about 500 millimeters in the western part and 300 to 400 in the eastern part. Therefore irrigation gets considerable emphasis.

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First of all, we are given a general statement about the Nizhnevskaya Oblast. The total area is said to be 10,200,000 hectares. There are 180 state farms and 383 collective farms. They vary in size from 2,000 to 50,000 hectares with an average of 12,000. Compared to other places, this is a high proportion of state farms. The rainfall is said to be about 500 millimeters in the western part and 300 to 400 in the eastern part. Therefore irrigation gets considerable emphasis.

There is said to be about 11 main kinds of soil in 5 groups as follows:

1. Ordinary chernozem with A horizons of 90 cm. (The area of this is 2 percent.
2. Northern Azov Chernozem with A horizons of 90 cm. (10 percent)
3. Southern Chernozem (36 percent)
4. Dark Chestnut soil (10 percent)

This has spots of Solonetz up to about 5 or 10 percent of the area.

5. Light Chestnut (Brown soil) (10 percent)

This also has spots of Solonetz. Perhaps the 32 percent includes Alluvial soils, Lithosols, Solonchak and Solonetz.

They say that about 87.7 percent of the land is used for agriculture: 57 percent is plowed; 5.7 percent is in natural meadow; 24.4 percent is mainly extensive pasture for sheep where much of the soil is Solonetz; and 0.6 percent is in orchards and vineyards. There is a small acreage for forest.

They point out that the differences in climate and soil give rise to great differences in farm economy. They show us a map with 5 zones:

1. Grain crops and livestock
2. Vegetables, mostly irrigated, near the town
3. Viticulture on irrigated soil
4. Animal husbandry with some grains
5. Sheep grazing (fine-wool sheep)

There is said to be about 11 main kinds of soil in 2 groups

as follows:

1. Ordinary chernozem with A horizon of 90 cm. (The area

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2. Northern Azov Chernozem with A horizon of 90 cm. (10 percent)

3. Southern Chernozem (30 percent)

4. Dark Chestnut soil (10 percent)

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1. Grain crops and livestock

2. Vegetables, mostly irrigated, near the town

3. Viticulture on irrigated soil

4. Animal husbandry with some grains

5. Sheep grazing (fine-wool sheep)

Generally their basis for agriculture is grain which accounts for about 65.4 percent of the arable land. This is roughly divided as follows:

Winter wheat	37 percent
Corn for grain	10 percent
Spring wheat	4.3 percent

Sunflowers account for 7.5 percent and there are smaller acreages of castor beans, sanfoin, grasses, mustard, seed flax, alfalfa, and so on.

The expect to expand orchards and vineyards from 83,700 to 250,000 or 300,000 hectares by 1960. Thirty-five state farms are specializing in orchards and vines although there are some on collective farms. But the heavy capital investment is difficult for the collectives.

They have several teams for soil surveys of state and collective farms and to make the interpretations and plans. This is about two-thirds done and they hope to have it completed in 2 years. They are giving increased emphasis to farming by scientific methods based on the soil maps. They have developed improved tillage, rotations, fertilizers and varieties according to the kinds of soil within the several zones. Emphasis is being given to animal fodder crops and to increased irrigation. About 300 specialists take part in making these plans plus the local trained workers on the farms. They now have 150,000 hectares irrigated and most of that has been developed within the last 7 years.

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They say the Don flows at about 300 to 400 cubic meters per second. This peaceful steppe river is high when the snow is melting in the spring. The new Tsimlyansk reservoir holds 24 billion cubic meters. Their dams allow them to have water for navigation, power, irrigation, and commercial fishing. They also have other small reservoirs and about 1,500 ponds and small lakes on farms. These help regulate water flow for irrigation and supply villages with water. The main Don canal flows at 150 cubic meters per second at the start and 80 cubic meters per second at the end. We are given a torrent of statistics on the length of canals, number of pumping stations, and the like. They are also carrying out drainage on the 36,000 hectares of the 123,000 that have been irrigated since 1950 as a result of the construction of the Volga-Don Canal.

Without irrigation they get 1.7 to 1.8 tons of small grain. This year they expect over 2 tons per hectare.

In making plans for the farms, the chairman or manager and the agronomist take full part. The plans are discussed at a meeting with all the specialists. After full discussion and settlement of the issues, managers of both state and collective farms are required to follow these plans.

We are told that this Institute was founded in 1949, partly in connection with the construction of the Don Canal. Near the top of the pool a canal has been constructed between the Don and the Volga just below Stalingrad. Afterwards the Institute took responsibility

They say the Don flows at about 300 to 400 cubic meters per second. This peaceful steppe river is high when the snow is melting in the spring. The new Tsimlyansk reservoir holds 24 billion cubic meters. Their dams allow them to have water for navigation, power, irrigation, and commercial fishing. They also have other small reservoirs and about 1,500 ponds and small lakes on farms. These help regulate water flow for irrigation and supply villages with water. The main Don canal flows at 150 cubic meters per second at the start and 80 cubic meters per second at the end. We are given a torrent of statistics on the length of canals, number of pumping stations, and the like. They are also carrying out drainage on the 36,000 hectares of the 123,000 that have been irrigated since 1920 as a result of the construction of the Volga-Don Canal.

Without irrigation they get 1.7 to 1.8 tons of small grain. This year they expect over 3 tons per hectare.

In making plans for the farms, the chairman or manager and the agronomist take full part. The plans are discussed at a meeting with all the specialists. After full discussion and settlement of the issues, managers of both state and collective farms are required to follow these plans.

We are told that this Institute was founded in 1949, partly in connection with the construction of the Don Canal. Near the top of the pool a canal has been constructed between the Don and the Volga just below Stalingrad. Afterwards the Institute took responsibility

for designing irrigation in all the northern part of the Oblast. Besides two substations they have several expeditionary parties. They have 1,100 people on the staff including design engineers, prospecting engineers, and topographic engineers. There are sections on hydrology, soils, construction, and agro-economics.

We have a long lecture from a large map that includes Stalingrad and Krasnodar about existing canals and planned canals for a large amount of irrigation. In this large area a million hectares are to be irrigated and farms and animals will be supplied with water on 13,000,000 hectares, including irrigation water for small vegetable plots. Ground water is insufficient and much of it is salty.

Then comes eating, drinking, and toasting. With effort I get the group into the cars at 10:10 a.m., and we drive south of Rostov and cross the Don. Here I note that a group of laborers at work on the railway track are about one-third women. The road has many turcks, a few cars, and a few small carts or wagons pulled by donkeys, horses, men, or women. I even see some bundles of marsh grass being hauled along the road on bicycles as we pass along the high grade through a wide area of marshy land. Through the industrial area I see many small individual houses with gardens. Several of the houses are painted blue and have green shutters. We pass a good windbreak of acacia, poplar, and other species.

On the way to the state farm we stop near the distribution canal (K-2550) that is a part of the Azov irrigation system that irrigates 35,000 hectares on 16 state and two collective farms. These have 450 to 7,500 irrigated hectares.

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to be irrigated and farms and animals will be supplied with water

on 12,000,000 hectares, including irrigation water for small vegetable

plots. Ground water is insufficient and much of it is salty.

Then comes eating, drinking, and resting. With effort I get

the group into the cars at 10:10 a.m., and we drive south of Rostov

and cross the Don. Here I note that a group of laborers at work on

the railway track are about one-third women. The road has many trucks,

a few cars, and a few small carts or wagons pulled by donkeys, horses,

men, or women. I even see some bundles of marsh grass being hauled

along the road on bicycles as we pass along the high grade through a

wide area of marshy land. Through the industrial area I see many

small individual houses with gardens. Several of the houses are painted

blue and have green shutters. We pass a good windbreak of aspens,

poplar, and other species.

On the way to the state farm we stop near the distribution canal

(K-2520) that is a part of the Arvo irrigation system that irrigates

32,000 hectares on 16 estates and two collective farms. These have 450

to 7,500 irrigated hectares.



K-2550. August 1, 1958. Near Rostov. Canal that brings water to Koisug State Farm.



K-2551. August 1, 1958. Near Rostov. Device for measuring water in irrigation canal.

K-2550

VII

K-2550. August 1, 1958. Near Rostov. Canal that
brings water to Kolaug State Farm.

K-2551

VII

K-2551. August 1, 1958. Near Rostov. Device
for measuring water in irrigation canal.

I look at a soil on a nearly level terrace said to be "Caucasian Chernozem." It looks to me like a dark Chestnut or Chestnut-Chernozem intergrade of the United States.

A _p	0 - 6"	Very dark brown (10YR 2/2) silty clay loam. Mostly medium granular with a few friable, medium, subangular blocky peds.
A ₁₂	6 - 19"	Very dark grayish-brown (10YR 3/2) silty clay loam that digs out in very easily friable clods. Mainly medium granular. Gradual-clear boundary.
A ₂₁	19 - 33"	Dark brown (10YR 3/3) silty clay. Digs out in very friable subangular peds that fall easily into medium granular. Slight vertical breakage of mass. Slight, weak clay skins. Peds removed show pressure faces but few clay skins. Gradual boundary.
B ₂₂	33 - 41"	Dark yellowish-brown (10YR 3/4) silty clay. Like above but somewhat coarser structure and more clay skins. Light brownish-gray silt on some ped faces. Fairly friable; plastic; clear wavy boundary.
C ₂₁	41 - 50" ⁴	Dark grayish-brown (10YR 4/2) silty clay. Friable medium angular blocky. After a little drying clods show a white network that suggests calcium carbonate. Soil moist.

Here my guides are not quite consistent. Now the general opinion is that in the Soviet scheme this soil is a Western Azov or pre-Caucasian Chernozem. The material is mainly loess, but it may have been reworked a bit by water.

Nearby I look at a nice old shelterbelt. (K-2552) The main tree is acacia, but there are ash and a few others. It has 9 rows about 6 or 7 feet apart and the crowns are 40 to 50 feet high.

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"Caucasian Chernozem." It looks to me like a dark Chestnut or

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Mostly medium granular with a few friable,
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is that in the Soviet scheme this soil is a Western Azov or pre-

Caucasian Chernozem. The material is mainly loess, but it may have

been reworked a bit by water.

Nearby I look at a nice old shelterbelt. (K-2522) The main tree

is acacia, but there are ash and a few others. It has 9 rows about

6 or 7 feet apart and the crowns are 40 to 50 feet high.



K-2552. August 1, 1958. Near Rostov. Shelterbelt on "Western Azov" Chernozem. Acacia with ash and a few others. Nine rows, 6 to 7 feet apart, crowns 40 to 50 feet high.

14-2552

VII-1

K-2552. August 1, 1958. Near Rostov. Shelterbelt on
"Western Azov" Chernozem. Asclepias with ash and
a few others. Nine rows, 6 to 7 feet apart, growing 40
to 50 feet high.

We drive along to the Koisug State Farm. We look at some of the irrigated vegetables including tomatoes, onions, carrots, red beets, eggplant, harvested potatoes, sweetcorn, cucumbers, cabbage, and marrow, or something like summer squash. We stop at a brigade headquarters and I am formally presented a bouquet of flowers by the brigade leader, who is a small and energetic woman. She had been given a brief speech to memorize about peace, which everybody wants.

We are taken into a little house for a lecture by Lishin who has been an agronomist on this farm since March, 1958. The farm has 9,870 hectares of which 4,150 are cultivated. All of it is in the old flood plain of the Don River. Some of the uncultivated land is on a wettish first terrace. Some 2,200 hectares are used for hay and 1,820 for pasture. About 2,900 hectares of cultivated land are irrigated and 1,150 are not irrigated. He shows us a soil map at a scale of 1:25,000. This shows 12 kinds of soil on this farm out of a total of 96 in the classification scheme for this local region. Except for the wettish soil they all belong to the general group of pre-Caucasian Chernozem.

The area under vegetables is said to have two crop rotations, one for 8 years and one for 10 years. The vegetable areas here will ultimately be planted to orchards. (It is certainly difficult for the visitor to know when he is being told the actual situation and when he is being told the plan.) The farm now has 500 hectares under vegetables. Next year a part will be under an 8-year rotation

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and a part under a 10-year rotation. Both rotations are supposed to have two years of grass for seed. I am not sure that I understand him correctly, but I think it seems to go something like this:

1. Perennial grass
2. Perennial grass
3. Potatoes
4. Potatoes
5. Vegetables: cabbage, tomatoes, etc.
6. Vegetables: cabbage, tomatoes, etc.
7. Vegetables: cabbage, tomatoes, etc.
8. Vegetables: cabbage, tomatoes, etc.

Then the other rotation with fodder crops is:

1. Alfalfa and barley
2. Alfalfa for hay
3. Spring wheat
4. Winter wheat
5. Winter wheat
6. Corn, 20 percent for grain and 80 percent for silage
7. Barley or oats
8. Barley or oats
9. Fallow
10. Corn

They have still other, somewhat different rotations for fodder crops that are planted close to the livestock barns.

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9. Fallow
10. Corn

They have still other, somewhat different rotations for fodder crops that are planted close to the livestock barns.

The farm has around 370 to 380 families with 520 laborers and 330 additional temporary laborers.

The livestock seems to be as follows:

Cattle	2,100 of which there are 835 milk cows
Hogs	2,560 of which 130 are sows
Poultry	26,000
Sheep	1,980
Beehives	200

On this state farm, as others, workers are paid only in cash. A quota is established for a day of each kind of work. If the worker exceeds his quota he is paid extra. The following example is used:

The worker is supposed to gather 300 kilograms of cucumbers in one 8-hour day and for that he gets 20 rubles. The brigade leader says that 80 to 85 percent of the people in her brigade over fulfil their quotas.

Each family has a garden plot. The ordinary worker has a .15-hectare plot and a specialist has .2 hectares. The family gets water for irrigation free. But this arrangement is only temporary. When all the reclamation scheme is finished, families will pay for their irrigation work.

Fertilizer is used at about .5 ton per hectare of nitrogen and superphosphate along with 10 to 15 tons of farmyard manure. Some crops need more and others less. On cabbage, for example, they use 150 kilograms of ammonium nitrate and about 350 kilograms of superphosphate.

The farm has around 370 to 380 families with 320 laborers

and 330 additional temporary laborers.

The livestock seems to be as follows:

Cattle	1,100 of which there are 835 milk cows
Hogs	1,250 of which 130 are sows
Poultry	25,000
Sheep	1,280
Beehives	200

On this state farm, as others, workers are paid only in cash.

A quota is established for a day of each kind of work. If the worker exceeds his quota he is paid extra. The following example

is used:

The worker is supposed to gather 300 kilograms of cucumbers in one 8-hour day and for that he gets 30 rubles. The brigade leader says that 80 to 85 percent of the people in her brigade over fulfill their quotas.

Each family has a garden plot. The ordinary worker has a 1.5-hectare plot and a specialist has 2 hectares. The family gets water for irrigation free. But this arrangement is only temporary. When all the reclamation scheme is finished, families will pay for their irrigation work.

Fertilizer is used at about .5 ton per hectare of nitrogen and superphosphate along with 10 to 15 tons of farmyard manure. Some crops need more and others less. On cabbage, for example, they use 150 kilograms of ammonium nitrate and about 350 kilograms of superphosphate.

We walk out into the fields. They make furrows for irrigation in the spring and remake them after cultivation. They usually irrigate about 10 times in furrows between alternate rows. They fill the head ditches after each irrigation to permit the use of tractors. It strikes me that the water here is poorly controlled. After questioning them about when they irrigate, it is clear that they simply follow the rule of the "wise farmer."

Each member of the brigade is responsible for a specific area of 1 to 1.25 hectares throughout the season, including the work in the hotbeds. Each one has a quota and a plan which describes the field operations and their costs.

As I look over the vegetables (K-2553), I note that most of the work is done by women. Many of them are barefoot. I ask about the lack of uniformity in the field and am told this is due to hail. If so, it must have come very early.

During the height of the harvest each brigade member has some special temporary help from housewives and students.

Here they seem to use a kind of factory system. Each worker has a worksheet with the planned time and cost of each operation. Each worker can work as many hours as he, rather she, wants to. Of course the work is inspected by the brigade leader. When the leader is satisfied with the work she signs the piece-work sheets. Then I am told that each worker gets 24 working days of vacation with pay; but it is not clear how that pay is calculated, perhaps simply the standard pay, or less if the average has been less.

We walk out into the fields. They make furrows for irrigation in the spring and remain there after cultivation. They usually irrigate about 10 times in furrows between alternate rows. They fill the head ditches after each irrigation to permit the use of tractors. It strikes me that the water here is poorly controlled. After questioning them about when they irrigate, it is clear that they simply follow the rule of the "wise farmer."

Each member of the brigade is responsible for a specific area of 1 to 1.5 hectares throughout the season, including the work in the household. Each one has a quota and a plan which describes the field operations and their costs.

As I look over the vegetables (K-3523), I note that most of the work is done by women. Many of them are barefoot. I ask about the lack of uniformity in the field and am told this is due to hail. If so, it must have come very early.

During the height of the harvest each brigade member has some special temporary help from housewives and students. Here they seem to use a kind of factory system. Each worker has a worksheet with the planned time and cost of each operation. Each worker can work as many hours as he, rather she, wants to. Of course the work is inspected by the brigade leader. When the leader is satisfied with the work she signs the piece-work sheets. Then I am told that each worker gets 24 working days of vacation with pay; but it is not clear how that pay is calculated, perhaps simply the standard pay, or less if the average has been less.



K-2553. August 1, 1958. Near Rostov. Irrigated vegetable area on Koisug State Farm.

K-2553

K-2553. August 1, 1958. Near Rostov. Irrigated vegetable
area on Krasnodar State Farm.

The carrots here are said to run 35 tons to the hectare. They certainly look good.

On the tomatoes they use a solution fertilizer. This has about 25 to 30 grams of ammonium nitrate and 50 to 60 grams of superphosphate for each 10 liters of water. They make two applications about 25 days apart at the rate of 1,500 liters per hectare, presumably shortly after the plants are set out.

We then go to the Red Orchard State Farm. This one has an area of 1,800 hectares, of which 750 are under orchard. Some 320 hectares of orchard are irrigated. By 1960 they hope to have 1,200 hectares in use with 1,050 in orchard of which about one-half will be apples. The other fruits are pears and cherries. By 1962 they expect to produce some 4,000 tons of these fruits. Recently their income has averaged 1.5 to 2.0 million rubles, net; last year it was 2.4 million. Out of this income 1,350,000 rubles went to the laborers including 180 permanent workers and 500 to 600 temporary laborers during harvest.

The profit from their operations is used for new houses, new machines, land reclamation, and new orchards.

There is said to be some chloride salts in the low places and I can see that they have some problems of drainage.

Here there are tall windbreaks of poplars. As I go over the orchard I notice that a part has rather poor trees. This condition is said to be due to poor drainage resulting from improper controlled irrigation and possibly some excess salt. I look at their canal from which they take water and their system is not very good.

The carrots here are said to run 35 tons to the hectare. They

certainly look good.

On the tomatoes they use a solution fertilizer. This has about

25 to 30 grams of ammonium nitrate and 20 to 60 grams of superphosphate for each 10 liters of water. They make two applications about

25 days apart at the rate of 1,500 liters per hectare, presumably

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orchard I notice that a part has rather poor trees. This condition

is said to be due to poor drainage resulting from improper controlled

irrigation and possibly some excess salt. I look at their canal from

which they take water and their system is not very good.

Then I am taken to a young orchard on a higher terrace where it is said that the water table is at 60 meters. (K-2554) The irrigation scheme is designed and they hope to build it next year. Here apple trees planted in 1955 are said to have root systems two meters deep and $3\frac{1}{2}$ meters in diameter. They have been fertilized with phosphorus.

Of course we have to take another lunch here and I sit next to an interesting old soil scientist, German Ivanovich Gruzdev. He is quite an old man and might have been taken for Professor Glinka. I take his picture next to one of the nice shelterbelts, designed primarily against summer winds - acacia, black poplar, ash, and elm. (K-2555) This shelterbelt is 4 years old and is only 15 feet high. Here they are afraid of hot winds from the east and like to design their shelterbelts around rectangular fields 1,000 meters long and 30 meters wide. The belt itself is 5 meters wide. The roads in the old orchard have rows of tall trees along with shrubs on either side for protection against the hot east winds. These are planted in either fall or spring but not in the fall if the soil is dry.

After a light lunch we drive to the Lenin Collective Farm. We leave the irrigated area and go onto a treeless, undulating plain - treeless except for a few distant shelterbelts. The crop is mainly wheat. Here for the first time I see baled straw from a stationary baler. Fairly young windbreaks are 1 to 2 kilometers apart. We detour a place where the road is being repaired. Most of the road workers are women.

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it is said that the water table is at 60 meters. (K-2524) The

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K-2554. August 1, 1958. Near Rostov. Apples planted in 1955 on Red Orchard State Farm. Western Azov Chernozem.



K-2555. August 1, 1958. Near Rostov. Four-year old shelterbelt on Red Orchard State Farm. Has Acacia, black poplar, ash, and elm. Mr. G. I. Gruzdev, local soil scientist.

K-2554

VIII

2

K-2554. August 1, 1958. Near Rostov. Apples planted in 1955 on Red Orchard State Farm. Western Asov Chernozem.

K-2555. August 1, 1958. Near Rostov. Four-year old shelter-belt on Red Orchard State Farm. Has Acacia, black poplar, ash, and elm. Mr. G. I. Grunberg, local soil scientist.

This Lenin Collective Farm is a "raiskhoz" -- a kolkhoz (collective farm) that produces seed for collective farms in the rayon. On this farm there are also sunflowers and land in fallow. As on some other farms the agronomist is a young woman, a graduate of an institute.

We stop at the field camp of a tractor brigade attached to a field brigade. (K-2556) The collective was founded in 1930. Then following World War II five smaller farms were combined with it so they now have 12,967 hectares of which 11,600 are cultivated. It is insisted that the farm is now completely mechanized. During 1957 gross farm income was 8,400,000 rubles in cash. For each labor-day unit, they paid as follows:

Cash	6.35 rubles
Wheat	2 kilograms
Sunflowers	200 grams
Vegetables	1 kilogram
Fodder	2 kilograms

The total cost of this labor-day unit is reckoned at 12½ rubles.

The farm is organized in 6 combined tractor and field brigades.

They cultivate 10,488 hectares. Three brigades look after 444 hectares of vegetables and another brigade has 200 hectares under orchard. The crops run something as follows, in hectares:

Rice	30
Winter wheat	3,135
Spring wheat	600

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(collective farm) that produces seed for collective farms in the rayon. On this farm there are also sunflowers and land in fallow. As on some other farms the agronomist is a young woman, a graduate of an institute.

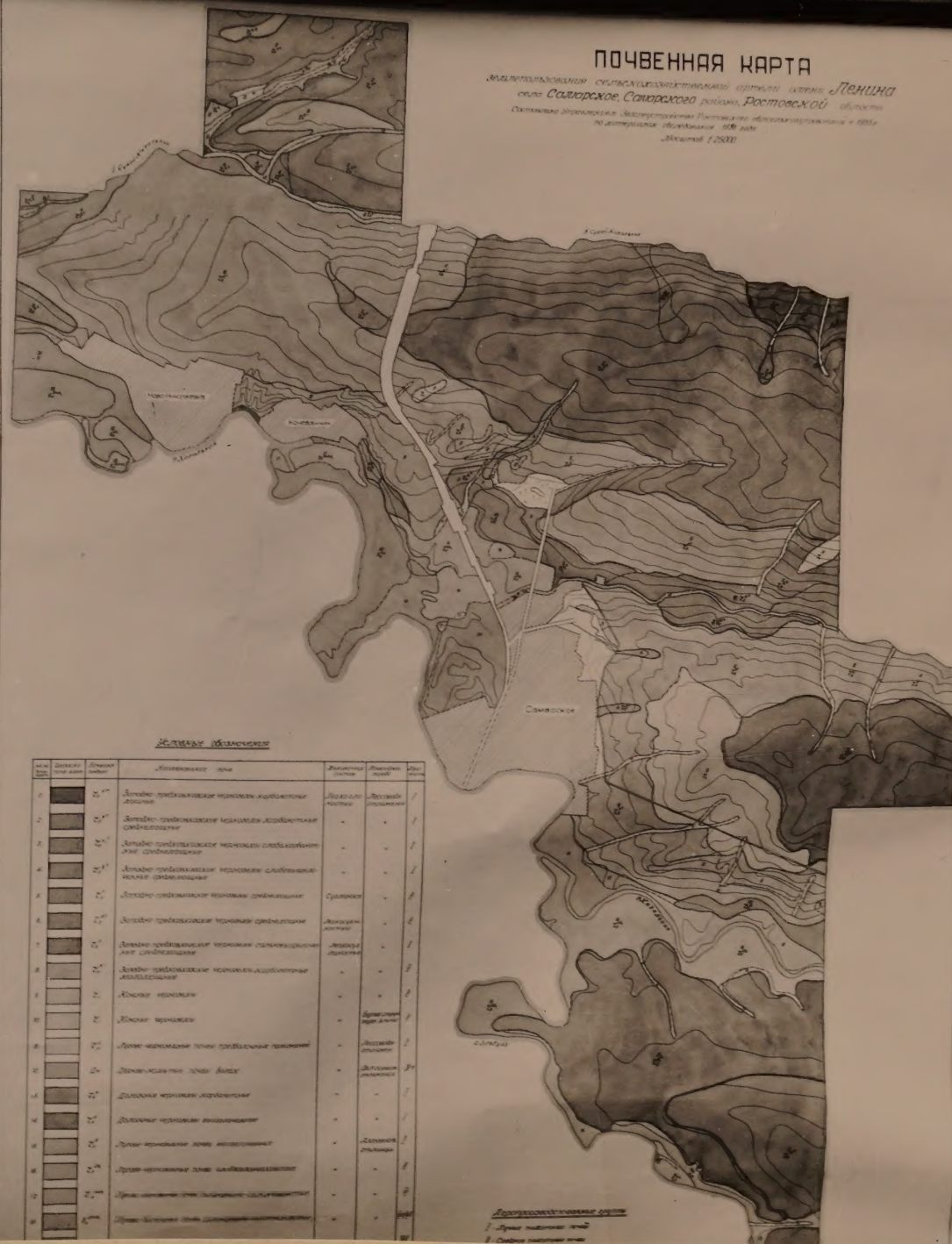
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Cash	6.35 rubles
Wheat	2 kilograms
Sunflowers	200 grams
Vegetables	1 kilogram
Potatoes	2 kilograms

The total cost of this labor-day unit is reckoned at 171 rubles. The farm is organized in 6 combined tractor and field brigades. They cultivate 10,488 hectares. Three brigades look after 444

hectares of vegetables and another brigade has 200 hectares under orchard. The crops run something as follows, in hectares:

Rice	30
Winter wheat	2,132
Spring wheat	600



K-2556. August 1, 1958. Near Rostov. Soil map of Lenin Collective Farm.

К-5220. Улунгау т' 1828. Невл Москоу. Болт нуб оу Гевин Коллектаве Естл.

K. 2556

VIII
X

Barley	1,150
Oats	105
Millet	120
Sunflowers	675
Corn for grain	1,705
Linseed	150
Sudan grass	1,400
Alfalfa and sanfoin	400
Mangel-wurzels	120
Corn for silage	1,250
Hybrid seed corn	173
Clean fallow	250
Occupied fallow	1,200

These figures are a bit confusing because they do not count the land in grass as cultivated land and they count some of the silage and other crops twice, once as crops and once as "occupied fallow." This means some duplicate acreage. For example, too, they plant corn, mow it when it is still small, and fallow the land for winter wheat; although more commonly the occupied fallow follows spring wheat.

Estimates on fertilization are a bit hard to get. They say they use 8 to 10 tons of well decomposed manure per hectare; superphosphate at .1 to .13 tons per hectare; and 45 kilograms of nitrogen as ammonium nitrate.

Barley	1,150
Oats	105
Millet	120
Sunflowers	675
Corn for grain	1,705
Linseed	150
Sudan grass	1,400
Alfalfa and sainfoin	400
Mangel-wurzel	120
Corn for silage	1,250
Hybrid seed corn	175
Clean fallow	250
Occupied fallow	1,200

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Estimates on fertilization are a bit hard to get. They say they use 8 to 10 tons of well decomposed manure per hectare; superphosphate at 1 to 1.5 tons per hectare; and 45 kilograms of nitrogen as ammonium nitrate.

This farm has bought its machines at a cost of 1,878,569 rubles. These include:

Tractors	33
Combine harvesters	23
Silage harvesters	6
Reapers for windrowing	25
Trucks	17
Cars	2

And of course, drills, harrows, etc.

The farm is said to be fully electrified. They give me the following figures on livestock:

Cattle	2,673, including 900 milk cows
Hogs	3,000, including 200 sows. (There are 400 sows that litter but once)
Sheep	3,526
Poultry	86,334, including 10,206 egg-laying hens 500 egg-laying turkeys 2,180 egg-laying ducks 800 egg-laying geese
Beehives	250

Then they give me the following figures of livestock for each 100 hectares available:

Cattle	23
Sheep	30
Hogs	24.4 (on arable land alone)

This farm has bought its machines at a cost of 1,378,262

rubles. These include:

Tractors	33
Combine harvesters	23
Silage harvesters	6
Reapers for mowing	25
Trucks	17
Cars	2

And of course, drills, harrows, etc.

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following figures on livestock:

Cattle	2,673, including 900 milk cows
Hogs	3,000, including 100 sows. (There are 400 sows that litter but once)
Sheep	3,315
Poultry	86,334, including 19,100 egg-laying hens
	500 egg-laying turkeys
	2,180 egg-laying ducks
	800 egg-laying geese
Bees	120

Then they give me the following figures of livestock for each 100 hectares available:

Cattle	23
Sheep	30
Hogs	24.4 (on arable land alone)

They claim to get 3 tons of meat for every 100 hectares in the farm.

Last year's yields were given as follows, in tons per hectare:

Winter wheat	2.1
Barley	1.9
Sunflowers	1.3
Rice	5.5
Corn for grain	2.0
Corn for stover	25

They claim 1,372 kilograms of milk per cow for the first 7 months of this year. They calculate 9.1 tons of milk for each 100 hectares of all land. Eggs averaged 80 per hen for the first 5 months, or 13,000 eggs per 100 hectares of plowed land. They have delivered to the government 3,100 tons of wheat for which they have received 2,400,000 rubles. They get a premium because their wheat is used for seed. They delivered 900 tons of corn.

This farm has 560 families and 960 workers. The chairman insists that he needs all these workers and could use more. This looks ridiculous to me.

They follow generally the following rotation:

1. Fallow
2. Winter wheat
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4. Spring wheat
5. Corn or other row crop
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7. Sunflowers
8. Perennial grass
9. Perennial grass
10. Plow

They use fertilizers both before and after planting corn.

I see some of the hybrid seed corn and it looks pretty good. I talk about it a bit with the agronomist, who is Miss Nina Lubovna Falenko. She is a graduate of the Azov-Black Sea Agricultural Institute as a seed specialist.

The sunflowers I see here are supposed to run 1.8 tons per hectare with 42 percent oil. These too, will be sold for seed.

Then we go to a field of corn and sudan grass being cut for silage. (K-2557) The crop is fair to good but is being cut from two to three weeks too early for the best protein quality.

Then I look at a field of seed corn that may run 4 tons per hectare. They used manure and superphosphate following wheat. The seed was treated with azotobacter.

We go to supper on the collective farm. Unhappily, Donnan and Cline are feeling ill and have to go back to the hotel.

This area reminds me very much of the Great Plains if one could drop out the sunflowers, increase the number of Norwegians, and paint the faces of the cattle white. I stop briefly to look at a "Pioneer" camp for small children. These Pioneers are very roughly comparable to our Boy Scouts, Cub Scouts, Brownies, and Girl Scouts altogether.

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K-2557. August 1, 1958. Near Rostov. Harvesting silage on Lenin Collective Farm.

K-2537

VIII
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K-2537. August 1, 1958. Near Rostov. Harvesting along on Lenin Collective Farm.

But the Pioneers are also educated in politics. Later they graduate from the Pioneers to the Consomols, and from thence into the Party. I am told that all children on this farm get a chance to go to this camp for one month. This means three groups. The dormitories are fairly clean, but a bit crowded and a bit smelly.

I ask the chairman about the number of people required to keep the farm records. He says there are 18 recorders for the 18 brigades plus 6 at the central headquarters.

We have a late supper in the remains of an old orchard that was essentially destroyed by the Germans. The table is placed under a temporary shelter. Fortunately, for me, a rain starts and comes down quite hard a little after 8. I point out the condition of these country roads and get the party on the road. Because of this hurry we are back to the hotel at 9:30. Donnan is now asleep and Cline is not very ill.

I get ready for an early departure in the morning and go to bed.

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August 2

We are up at 5 a.m., pack, and go to the airport with time for tea.

The wheels are up for Krasnodar at 6:40 a.m. Now it is partly cloudy and cool.

I recall that the institutes emphasize checking corn for cross cultivation. But on few farms is it done accurately enough for that. Some of the stands of corn and sunflowers are not very even. The institutes also emphasize fertilizer placement, yet not many of the farms have the machinery to do it.

I notice that in some places the straw is being burned in advance of plowing contrary to the recommendations.

About 30 minutes out I see essentially the same crop pattern as on the last farm yesterday: corn, wheat, fallow, sunflowers, and meadow. The small streams have low dams for ponds. The soil looks to be undulating Chernozem and mostly arable. Although some fields lack shelterbelts, there are quite a few of medium height about one-fourth mile apart.

We fly over a town that I take to be Tikhoretsk at 7:16. Again we have the same pattern of soils and crops. On either side of a railroad are shelterbelts of about 10 rows. Those around the fields look to have about 4 rows. Here the Chernozem is blacker, and probably deeper, than under comparable conditions in our Great Plains. Perhaps more water from these gentle rains gets into the soil; and there is less erosion. I'm told that very heavy rains are rare here,

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although they do come occasionally. I see pools in the drainageways but none elsewhere. Only some of the old cereal fields have been heavily burned to destroy both straw and stubble.

Most of the villages are near the streams where a water supply for homes and stock can be had with small dams. I do not see much stock in the meadows.

We are now a few minutes out of Krasnodar. The plane turns west, near the river and the large reservoir pool. Along the stream, the pattern of fields is complex. Near the river, some of the land appears to be unused. Elsewhere the surface is undulating Chernozem with cereals, fallow, corn, sunflowers, and meadow.

The wheels are down at Krasnodar at 8:00 a.m. We are met by several local agriculturists including:

1. Ogurtsov, Nikolai Alekseevich - Chief of the Krai Administration of Water Economy.
2. Pepenko, Karp Alekseevich - Chief Engineer of the Krai Administration of Water Economy.
3. Erofeev, Georgii Pavlovich - Engineer for Exploitation of Irrigation and Water Supply Systems.
4. Belichko, Evgenii Borisovich - Doctor of Agricultural Sciences. Director of the Chair for Amelioration of the Kuban Agricultural Institute.
5. Braun, Georgii Pavlovich - Chief of the Administration of Construction of Rice Irrigation Systems.
6. Ermolaev, Vladimi Aleksandrovich - Chief Engineer of the Krasnodar Filial "Giprovodkhov".
7. Akimenko, Dmitrii Afanasevich - Chief Engineer of the Trust "Meliovodstroi".

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As we drive into the city, I see only fair home gardens with fruit and vegetables. Because of recent rains the side streets are muddy and impassable to cars. The main road is cobblestone. (In this Zim car the clock also works.) I see peat cakes for fuel piled up by the houses. Ditch diggers along the city street are more than one-half women, fairly well dressed in cotton prints. We pass a large church in good repair that is being used as a church. The interior of the city looks quite nice with many small trees along the streets.

We reach the Krasnodar Hotel at 8:35 and have a slow and elaborate breakfast.

Here the first subdivision is not the oblast but the "krai".

At 10:50 a.m. we go to the office of the Department of Water Economy of the Administration of the Krasnodarskaya Krai and discuss our program. They speak of the Kuban area, or Krasnodar region, as having 82,000 sq. km. About 6,000,000 hectares are under crops. As usual, we are told that climatic and soil conditions vary. In the north there is about 400 millimeters of rain and it goes to 1,200 near the coast of the Black Sea. In the central part, in the valley of the Kuban, it is around 600 to 700. The average temperature goes from around 10°C in the north to around 13° in the south. The soils in the north are weakly carbonated, carbonated, and ordinary Chernozem with ordinary Chernozem and leached Chernozem in the southwest.

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In the north, grain crops predominate. In the central part they have grain, sunflowers, castor beans, oil crops, tobacco, and sugarbeets. Further south there is grain, vegetables, orchards, vineyards, and tobacco. Each area has livestock including sheep, hogs, poultry, and some cattle. Lately the farmers of the Krai have been anxious to get new crops. Sugarbeets are increasing and processing plants are being built. The acreage of sugarbeets has gone up 4 times since 1953. Corn both for grain and forage is increasing in the northern and central parts of the Krai. Orchards and vineyards are expanding. From 65,000 hectares of orchards they expect to go to 200,000 by 1970. Last year they had only 52,000 hectares in orchard. From 43,000 hectares of vines they plan to go to 300,000. Some of this increase will come from new land and some by changes in the present cropping systems. They grow about 107 different crops. The main one is winter wheat. (The grains as a whole account for 54 percent of the cropland.) After wheat the crops are as follows in order of importance: spring barley, spring rye, oats, pulses, corn as grain (12%), rice sugarbeets, sunflowers, coriander, hemp, fiber flax, and castor beans. They also grow the usual vegetables, tobacco, and crops for essential oils.

They emphasize that the collective farms are free to grow the crops most suitable for them!! A few places have citrus.

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They also grow the usual vegetables, tobacco, and crops for essential oils. spring barley, spring rye, oats, pulses, corn as grain (12%), rice (12%), winter wheat. (The grains as a whole account for 25 percent of the cropping systems. They grow about 10% different crops. The main one increase will come from new land and some by changes in the present From 43,000 hectares of vines they plan to go to 300,000. Some of this 100,000 by 1970. Last year they had only 25,000 hectares in orchard. expanding. From 65,000 hectares of orchards they expect to go to northern and central parts of the Ural. Orchards and vineyards are since 1953. Corn both for grain and forage is increasing in the plants are being built. The acreage of sugarbeets has gone up 4 times been anxious to get new crops. Sugarbeets are interesting and processing hogs, poultry, and some cattle. Lately the farmers of the Ural have vineyards, and tobacco. Each area has livestock including sheep, and angustata. Further south there is grain, vegetables, orchards, they have grain, sunflowers, castor beans, oil crops, tobacco, In the north, grain crops predominate. In the central part

Many collective farms have been combined into larger ones. Of course, this process has been going on all over the Soviet Union. (I have heard the figure of 90,000 collective and state farms for the whole USSR.) In this Krai they had 2,400 collective farms in 1940 and only 433 in 1958. They average about 10,000 hectares. The state farms went from 132 in 1940 to 142 in 1958 with an average size of 6,500 hectares. It is said that both kinds of farms grow about the same crops; but I strongly suspect that the more valuable ones calling for large capital outlays are emphasized on the state farms.

I am given some statistics about livestock that seem curious to an American:

27.7 cattle per 100 hectares including crop and pasture land

but not forest land;

11.9 cows per 100 hectares;

48 hogs per 100 hectares of planted land;

31 sheep per 100 hectares of total agricultural land; and

647 poultry per 100 hectares of land under grain.

Most cattle are dual purpose but some are milk cows. Last year they report an average of 2,330 kilograms of milk per cow. (I am suspicious of this figure as some kind of gross not comparable to our reported figures.) Last year they had 25 tons of milk per 100 hectares of total agricultural land. Emphasis is being given to increasing milk production per cow.

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Shelterbelts are essential in this Krai, especially in the northern part. Some of the small ones replace those destroyed by the Germans; some are entirely new. All the northern and central parts of the Krai were occupied by the German army and the destruction was great, especially in Krasnodar and in the west.

They tell me that about 75 percent of the population of the Krai are farm people. (This is certainly too high for a good economy.)

Average yields of winter wheat are as follows, in tons per hectare:

1956	1.5
1957	2.03
1958	2.55
Plan for 1960	2.6

They say that both 1957 and 1958 were better-than-average years. They hope to have better varieties widely grown and higher rates of both mineral and organic fertilization. They recommend that farmers burn only stubble, not straw, and then only when it is helpful in destroying pests.

Water economy is discussed by the chief engineer of the water department of the Krai, Mr. July. The Kuban River, called the King of Rivers, is the principal water resource. It rises near Mt. Elbruse of the Caucasus Chain. It goes to the Azov Sea in two beds west of Krasnodar. A third one formerly went directly to the Black Sea, but this is now only a canal. The flow in the river is variable. It floods in early spring and again in the beginning of summer. Before the construction of the present dams, embankments, and two flood-water reservoirs, the river flooded 650,000 hectares. A main task of the

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work is to control the floods. In the steppe zone several small rivers flow directly into the Azov Sea only during spring and early summer. (I had seen some of the dams on these streams.) In the future some water from the Kuban must be sent up to the steppe zone. It is a problem to control the mountain rivers that flow into the Kuban. In its lower reaches, parts of the river are higher than the near-by land. This permits gravity irrigation below Krasnodar.

The water is used in the lower reaches for rice and they plan a large expansion of this crop. This will involve drainage into the Azov Sea. They now have 33,000 hectares of irrigated rice, with works for 24,000 under construction and a total of 65,000 is planned for the future. Other systems are developed or planned for other crops for a total of 30,000 hectares in small areas.

Now they use on rice 23,000 cu. meters per hectare from the river, of which 18,000 cu. meters per hectare reach the fields, and about 10.5 cu. meters are actually adsorbed by the soil. Three thousand to 3,500 cu. meters are evaporated from each hectare during growth. They estimate 4,000 to 4,500 cu. meters for transpiration during the vegetative period. This varies with the rainfall. Around 1,800 cu. meters are lost in drainage and seepage.

They have a serious problem of silting. Apparently a lot of loess gets carried down in the stream. About 23 percent is caught in settling basins, 56 percent in the distribution system, and 2.5 percent goes into the drainage water. They remove about 20 to 40 tons per hectare in cleaning the canals.

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We are presented with several issues of a new agricultural magazine. One issue is missing; perhaps it has some interesting statistics in it.

We leave at 1:00 p.m.

After lunch we go to the Kuban Rice Experiment Station which was organized in 1932 under the Ministry of Agriculture of the Russian Republic. They list the following sections:

1. Administrative
2. Agro-technical
 - a. Agro-chemical
 - b. Plant physiology
3. Selection and breeding
4. Economy of organization, including mechanization
5. Scientific laboratory
- 6/ Experimental farm of 60 hectares at some distance from the city.

Initial experiments are conducted in and around this building within the city. From there experiments go to the experimental farm and then tests are made on state and collective farms in the lower Kuban, in the Don basin, in the Terek River delta, and in the lower Volga. They gave up the idea of permanent experimental fields in these areas and depend upon temporary plots handled by expeditions.

They maintain they have solved the two main problems for which the Institute was founded:

1. The development of new agro-technical methods for growing rice that would permit mechanization, including harvesting. They had to invent an irrigation system of plots unlike those of the Orient.

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1. The development of new agro-technical methods for growing rice that would permit mechanization, including harvesting. They had to invent an irrigation system of plots unlike those of the Orient.

2. They had to breed new varieties with short vegetative periods and enough response to length of day so that the crop would ripen in this latitude (about 44° to 48° .) They now have some that can be matured at 50° latitude and are already growing rice on a fair scale at 48° . They have developed 20 new varieties, of which 12 are grown on a large scale after governmental approval.

They have developed new irrigation systems and new machinery, including reapers for windrowing, a combine harvester, and a special plow for spring plowing.

All of these results are described in a monograph on Physiological elements of rice irrigation by Professor P. S. Erygin.

They are now concerned with developing rice throughout the southern part of the Soviet Union. This station has educated a whole group of rice growers. Besides the school for rice growers they train graduate students of the USSR and other countries.

The scientific staff of nine includes one Ph.D. and eight masters candidates.

(As the day is advancing, we take a brief recess and Dr. Nelson and Mr. Bulik leave for a visit to the All-Union Institute of Tobacco and Makhorka.)

For rice they use a rotation of 2 or 3 years of rice, perennial grasses (mainly alfalfa), and fallow or occupied fallow. This works out for a field to be 62 percent rice, 25 percent perennial grass, and 13 percent bare fallow.

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They are now concerned with developing rice throughout the southern

part of the Soviet Union. This section has educated a whole group of

rice growers. Besides the school for rice growers they train graduate

students of the USSR and other countries.

The scientific staff of nine includes one Ph.D. and eight masters

candidates.

(As the day is advancing, we take a brief recess and Mr. Nelson

and Mr. Bulik leave for a visit to the All-Union Institute of Tobacco

and Machine.)

For rice they use a rotation of 1 or 2 years of rice, perennial

grasses (mainly alfalfa), and fallow or occupied fallow. This works

out for a field to be 65 percent rice, 15 percent perennial grass, and

15 percent bare fallow.

The rice is grown on rather clayey soils from silty alluvium, but not on very heavy clays. Many of these are former peaty soils exposed after control of the floods. These are also mixed with alluvium from surrounding areas. The crop is seeded with drills just before flooding. Two-thirds of the fertilizer is applied with drills before flooding and one-third with planes after the rice comes up. They also use planes for applying herbicides. They use ammonium sulphate to get about 60 to 90 kilograms of nitrogen per hectare, potassium salts to get about 40 pounds of K_2O , and superphosphate according to need.

They have not studied micro-nutrients enough to make recommendations. They have no "cat" clays.

They flood immediately after sowing to cover the whole field to about 8 to 10 centimeters. After the rice sprouts they flood again to 12 to 18 centimeters, depending on the weather and the amount of weeds.

They can grow fish with the rice but this is not popular with farmers because it complicates the harvest and attracts herons onto the fields. The fish and rice combination works better far from the sea than near the sea. It is claimed that the rice yields are better if fish (carp) are grown with the crop. Perhaps these fish weighing about 200 to 300 grams disturb the film on the soil surface and increase aeration.

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Upland rice yields 3.5 to 4 tons per hectare but it costs too much to control weeds. Were it not for the weeds the cost of upland rice would be lower; but as it is it is 2 or 3 times higher.

They reckon 18,000 cu. meters of water per hectare for rice, not counting losses (I take it canal losses.) They plant rice on fairly salty soils; as time goes on the salts disappear.

Since they need to have soils where there is water, they try to breed varieties for different kinds of soil including marshy and salty ones. They use:

1. Young alluvial soils
2. Marshy soils with a pH of about 6 to 6.5
3. Meadow soils. Here the humus horizon is darker and thicker and the structure better. The lower horizons are gleyed and almost impermeable. The soils are rich in ferrous iron.
4. Chernozem-like soils with thick A_1 horizons of about one meter. The lower horizons are gleyed and compact. This is the best soil for rice. It is rich in nutrients and has a good physical condition for holding water. They get 7 to 8 tons of rice per hectare.
5. Ordinary Chernozem.

Soils 2 and 3 above are hard to cultivate because of the high silt content. In some of the areas they have had success on Solonchak and Solonetz. In some areas the plots were originally acid but have become carbonated by the alluvium in the irrigation water. Most ordinary Chernozem is too permeable for economic rice growing.

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They have studied the soil changes under rice. Ammonification is speeded up. Since nitrate forms are unimportant to rice, any accumulation of nitrates is wasteful since these are reduced and lost as nitrogen gas. Ammonia formation is encouraged by green organic matter. Thus 2 years of alfalfa fixes 180 to 250 kilograms per hectare of pure nitrogen converted to the ammonia form. This provides for high yields of rice for 2 or 3 years. Continuous rice culture over 15 or 20 years without fertilizer exhausts the nitrogen.

Phosphorus is second to nitrogen since the soils are fairly rich in phosphorus. Potash comes in with the irrigation water. Thus fertilizers with these two elements are needed only at high levels of nitrogen.

They found that the higher the moving ferrous iron, the lower the yield of rice and the poorer the soil structure. After plowing under perennial grasses they have 100 to 150 mg. of iron per kilo of dry soil; but on soils long used for continuous rice they found 5,000 mg. per kilo of dry soil. To determine ferrous iron, they extract the soil with 0.01 N HCl using moist soil and taking account of air and moisture.

They consider aeration as the important objective of tillage. The crop rotation system provides for dry fields after rice in order to dry the soil. The maximum depth of plowing is 27 centimeters. In years of low temperature they delay operations for the soil to become warm. In some regions, shallow basins are made for heating the water but this is not a common practice.

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They consider rotation as the important objective of tillage. The crop rotation system provides for dry fields after rice in order to dry the soil. The maximum depth of plowing is 15 centimeters. In years of low temperature they delay operations for the soil to become warm. In some regions, shallow basins are made for heating the water but this is not a common practice.

Another speaker suggests plowing in the fall to 20 or 25 centimeters. They are trying to find herbicides to reduce the hand weeding.

Bunds make the use of tractors difficult. The larger the plot the lower the cost of tractor use. Commonly they have 1.5 to 2.0 hectares in one paddy plot. They now have some fields about 230 meters wide and 1 to 1.5 km. long. This gives them around 20 to 40 hectares that are divided into individual plots of 1.5 to 2.0 hectares. For 1,000 hectares this requires 12 km. for main and distribution canals for irrigation and 11.2 km for drainage canals. Head ditches make another 44 km. for both irrigation and drainage. Then there are 14 km. of roads.

Weeds are a serious problem. One tries to manage the water to help the rice and to suppress the weeds. When flooded after seeding they try to keep the soil wet but not to maintain a specific level of water. When the seedlings clearly appear they flood and try to cover the weeds completely. Then the water level needs to be relatively low up to the tillering stage. After tillering until the dough stage water is maintained at about 12 centimeters. Then the water is shut off until the soil is dry enough for harvest. The drains are open after tillering.

The surface is prepared precisely by land leveling to a precision of ± 5 cm. Deep cuts reduce yield and are avoided. Normally they move about 300 cu. meters of soil per hectare.

Another speaker suggests plowing in the fall to 30 or 35 centimeters. They are trying to find herbicides to reduce the hand weeding.

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This speaker opposes windbreaks in rice fields because he thinks the trees take too much water. (Added later: After visits to the rice-growing area my guess is that this is a minority view).

We take a look at the physiological laboratory and the small research plots near the building. (K-2558)

We have dinner at 7:00. This being my birthday, my colleagues present me with a package of tea.

The maitre d'hotel here is an experienced one who is very anxious to please us. Of course, I don't know, but I suspect he may have been brought here for the period of our visit. Although a respectable dining room, with the usual loud music of such places, they have a few rough customers who have to be helped out.

After dinner we have a short conference of the delegation.

Again today it was a bit hard to get straight-forward statements of production, especially of milk.

I am going to bed early despite having a room facing the street on a noisy Saturday night.

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K-2558. August 2, 1958. Krasnodar. At the Kuban Rice Station.

VIII-6

K-2528. August 2, 1958. Krasnodar. At the Kuban Rice Station.

August 3

I am up at 6:30 and take a walk. In the towns, and especially on the farms, except for the obvious students, one meets few young men in their 20's, but lots of young women. I suppose the young men are in the army. (I understand that training maneuvers are now underway.)

Every town seems to have one or several parks with nice flower gardens. On the whole, the kinds of flowers are about the same as ours in Washington. I see roses, salvia, morning-glory, sweet william, pansies, asters, argeratum, cannas, geraniums, coxcomb, dahlia, begonia, petunia, portulaca, lilacs, English box, privet, and hardy palms.

Now at 7 o'clock there are many mothers sitting in the park with their babies. As I walk along the streets I see lots of candy stores even though candy is very expensive. I see an unusually high proportion of toys in the shop windows. Here too there are lines waiting at the food shops. I see no goods in the windows of United States manufacture, but lots of copies made in the Soviet Union, even electric razors. Most of the costume jewelry and objects d'art are quite poor.

After breakfast we leave at 8:50 for the lower Kuban. This promises to be a sunny, warm day. Along the road is a beautifully formed windbreak. The center is poplar and the outside rows are low acacia. We pass a field of excellent corn. Here I see a millet that looks like broomcorn. Some of the orchards are only fair. We pass a village with rather small houses. Some of the roofs are thatched

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and some are metal, but most of them are tile. Near the houses are many small stacks of peat (or manure?) bricks for fuel. Then other bricks appear to have also clay and straw. These are used for making the walls of houses. The home plots seem to have some of this broomcorn along with corn, sunflowers, fruit trees, and vegetables.

We go along a new tar-bound gravel road that is only fair despite the nearly level grade and the good subgrade.

Along here all the wheat has been harvested. We are driving on a well drained terrace and the soils are probably ordinary Chernozem. Crops look quite good: Wheat, meadow, sunflowers, corn, late corn for silage, wheat, vines (well sprayed), fallow, late corn for silage, broomcorn (or millet), sunflowers, meadow-pasture after cereal, and a little unused land.

We pass another village where there are a few new houses that are quite a cut above those built immediately after the German War. We turn off on an earth road, which is not too bad now that it is dry. We pass large tobacco-drying sheds near fields of tobacco and sunflowers. We pass a large area of young soil from clayey alluvium that has been recently plowed. There is a good deal of land here just plowed after cereal harvest. I see two herds of Red Steppe cattle in only fair flesh. Then there is more wasteland and sunflowers. I pass a young shelterbelt here, mainly of maples, suffering from too much competition with grass, and then an older woods that is mainly oak.

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These earth roads are terribly dusty.

We pass sunflowers, this broomcorn or millet, corn, wheat stubble, and corn.

We cross over the main irrigation canal serving 12 collective farms and one state farm and stop at the "head lock." I am told that the first length of the canal from the river catches about 18 or 20 percent of the silt from the water out of 100,000 to 120,000 tons brought by the canal. (K-2559) This settling basin which forms the first part of the canal is cleaned each spring. Although the canal brings water to 12,000 hectares, it has a capacity for 21,000. All of the water is ultimately for paddy rice. They now use 21 cubic meters per second, but could use 51 cubic meters per second. The silt basin is 1,150 meters long between the river and the head gate.

Beyond this main area of irrigation they have two other irrigated rice areas supplied by drainage (or tail) water from this main area. They say the water is sweet and can be used for other crops. The water has less than one gram of salt per liter. It consists mainly of sodium chloride, potassium chloride, and calcium sulphate.

Here again one sees the heavy new machines and then much hauling in little wagons pulled by one or two small horses. (K-2560)

We drive along a branch canal bordered by rice fields. They have many narrow windbreaks, mainly of poplar. Contrary to what I had heard, the people here say that early spring winds make waves in the unprotected rice paddies that disturb the seeds before they are rooted. (K-2561)

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K-2559. August 3, 1958. West of Krasnodar. Settling basin in a main irrigation canal from the Kuban River.



K-2560. August 3, 1958. West of Krasnodar. Hauling hay.

Y-2559

VIII-7

K-2559. August 3, 1958. West of Krasnodar. Settling basin in a main irrigation canal from the Kuban River.

Y-2560

VIII-8

K-2560. August 3, 1958. West of Krasnodar. Hauling bay.



K-2561. August 3, 1958. West of Krasnodar. Village near irrigation canal.



K-2562. August 3, 1958. West of Krasnodar. Rice Experimental Station: Second rice crop after alfalfa (Variety: Krasnormayski No. 313).

K-2561

IX

K-2561. August 3, 1958. West of Krasnodar. Village near
irrigation canal.

K-2562

IX

K-2562. August 3, 1958. West of Krasnodar. Rice
Experimental Station: Second rice crop
after alfalfa (Variety: Krasnodarski No. 313).

We go to the rice experimental field station that is handled by the Kuban Rice Station that we visited yesterday. This area is said to have been marshland before 1937. During the war there was a big battle here and all but three buildings were destroyed. Near the headquarters in a walnut grove there is a little blue monument to forty-three Soviet soldiers who died here.

They tell me that they have 135 hectares of irrigated rice paddy laid out to have an irrigation ditch on one side and a drainage ditch on the other. (Yesterday I understood 60 hectares.)

I look very hurriedly at a Meadow-Chernozem used for rice that is now resting under alfalfa. The water came up in the pit to 15 inches of the surface. Actually the subsoil serves as a "lid" on the ground water which is under some pressure just now.

The surface soil is black clay with some fine mottling with reddish-brown in the upper inch or so. The soil is granular. This surface A horizon is about 12 to 15 inches thick. The pH is about 6.5 to 6.8.

The B horizon runs to about 35 inches. It is very dark gray (10YR 3/1) heavy clay, mottled with strong brown (7.5YR 5/6). The soil is cracked into large irregular blocks with some excess of vertical breakage, yet it is well permeated with roots. The B is very near to being a claypan, yet is not completely impermeable.

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At about 40 to 50 inches the soil is said to have calcium carbonate concretions and to be quite compact. I see the material from this C horizon. The concretions are small and the soil is gray, mottled with yellow and brown.

This is an excellent soil for paddy. I am told that the soil is more gleyed and more compact than formerly, although it was deeply gleyed before development into arable soil. Before irrigation the water table stood at 2 to 3 meters in the dry season; now it stands at 100 to 120 centimeters.

I take a kodachrome of the pit here. (K-2650) I ask for a man to stand in it and Eddie Baranov, my young and very good interpreter, volunteers. Then he takes out a notebook and starts to scribble as I do. "Now," he says, "I am a soil scientist!"

They have mowed the alfalfa here once and will mow it twice more. The first year they get 4 tons per hectare and this year they expect between 8 and 12 tons. They do not need to irrigate because of the irrigation of the adjacent rice paddies. The water table fluctuates from 80 to 90 centimeters from the surface after flooding rice. When the water is withdrawn from the rice fields the water table drops to around 100 to 120 centimeters. Because of this near-claypan in the soil, the water is held down, away from the surface soil. Most of the alfalfa roots are in this plowed surface. But if holes are dug through the claypan the field becomes waterlogged.

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K-2650. August 3, 1958. West of Krasnodar. Rice experimental farm. "Meadow Chernozem" under alfalfa. (Eddie).



K-2651. August 3, 1958. West of Krasnodar. Rice experimental farm. Rice fertilized at tillering stage.

K-2650. August 3, 1958. West of Krasnodar. Rice
experimental farm. "Meadow Chernozem" under
alfalfa. (Eddie).

K-2651. August 3, 1958. West of Krasnodar. Rice
experimental farm. Rice fertilized at tillering
stage.

I get some nice pictures of rice that has been fertilized at the tillering stage with a mixture applied to the surface containing 150 kilograms per hectare of each superphosphate and sulphate of ammonia. (K-2651) At this time the water level is reduced to 5 centimeters and then later returned to about 10 to 12 centimeters. I notice some dark green spots from heavy applications of nitrogen fertilizer. My hosts expect a little over 4 tons per hectare and Dr. Cline estimates a little over 80 bushels per acre.

We look at several fields treated in different ways. The last one is a first-year crop after alfalfa and not fertilized. The alfalfa sod is plowed late in October and then harrowed with tractors. If plowed earlier nitrogen is lost. In this system there are few weeds so they need only a shallow plowing in early May. Then the dry soil is smoothed by disking and rolling. One hundred and eighty kilograms of seed are sown per hectare with disk seed drills under good control for depth. This high rate of seeding they find increases yields and helps reduce weeds.

We look at another field of rice the second year after alfalfa. (K-2562) This was plowed to 20 or 25 centimeters in late autumn, not touched in the winter, and harrowed in the spring. In April it was plowed without moldboards for aeration and to cut the roots of weeds, leveled, given a shallow plowing, disked, and rolled. The field was seeded like the previous one and given 150 kilograms of superphosphate and a little ammonium sulphate. This was broadcast

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We look at another field of rice the second year after alfalfa. (K-2552) This was plowed to 20 or 25 centimeters in late autumn, not touched in the winter, and harrowed in the spring. In April it was plowed without moldboards for aeration and to cut the roots of weeds, leveled, given a shallow plowing, disked, and rolled. The field was seeded like the previous one and given 150 kilograms of superphosphate and a little ammonium sulphate. This was broadcast

before the last shallow plowing and the crop fertilized again at the tillering stage. To me, it seems wasteful to use superphosphate on rice at the tillering stage. This field is somewhat more weedy than the other one. They expect 5 tons per hectare of which one ton will be due to the fertilizer.

After alfalfa they expect 5 tons the first year, 4 tons the second year, and 3 tons the third year without fertilizer. They can omit the nitrogen at planting time the first year after alfalfa, but need to use about 150 kilograms of ammonium sulphate per hectare at the tillering stage, and at both planting time and the tillering stage in subsequent years.

They do not recommend growing rice in a plot for more than three years and it is better to have only two years. This is partly a matter of fertilizer costs and partly a matter of weeds.

I photograph this second-year crop after alfalfa. It may lodge during ripening. The variety is Krasnormaysk No. 313, developed here from Japanese parents.

Next I see fallow being flooded to control weeds. The flooding promotes them and after the water is removed they aerate the soil. They are trying to work out ways to plow and to cultivate with tractors when the soil is flooded. I am shown a small bulb of their worst weed that resembles nutgrass. When cultivated with the water on the field by heavy spike harrows, the bulbs come to the surface of the water and are collected by hand or plowed down. They have been able to get some control with herbicides but not so much as they should like.

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They are trying to work out ways to plow and to cultivate with tractors when the soil is flooded. I am shown a small bulb of their worst weed that resembles nutgrass. When cultivated with the water on the field by heavy spade harrows, the bulbs come to the surface of the water and are collected by hand or plowed down. They have been able to get some control with herbicides but not so much as

they should like.

I am shown a nice setup for measuring water use by transpiration, evaporation, and seepage. This is done by combinations of open pots and closed pots with devices for maintaining water levels. They also have test wells for measuring the water tables from 30 to 100 meters below the surface. These indicate the relative impermeability of the B horizon. When they go deeper than one meter water comes to the surface. I am told that they use hand dusters of DDT every 10 days to control mosquitoes around the home. The government dusts the fields by planes once or twice each year.

We see the rice variety plots. Some of them ripen in 90 to 100 days and they expect 5 to 6 tons per hectare during this short period. Dubovski 129 is the main variety for the lower Kuban, although they have earlier ones. They claim 6 to 6.5 tons per hectare. The next one I see is Bros 213. It requires 8 to 9 days more but has given 8 tons per hectare in trials. A still later one, Krasnodar 424, has given as much as 12 tons per hectare but it requires very careful management. I am told that here they have autumn rains so that the crop must be gotten off early, especially where machines are used. Eleven other varieties are under their last field test before final test for approval by a special commission of the government. Another 25 varieties are in small plots and around 1,500 to 2,000 are under selection.

In the laboratory on the station they tell me now that they have a total of 320 hectares, of which 175 are irrigated. (This station seems to grow with the telling!) Besides rice, they have orchards and vines and 7 hectares of shelterbelts. There are cattle,

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hogs, and poultry for use by the people who work here. I am told that they use the income from the crops and livestock for buildings as well as that from the rice seed that they sell. This amounts to about 100 tons of pure seed. But in the years of early rainy autumns and cool summers, the seed harvest is low.

Seed is sold to the government which furnishes it to farms as a subsidy. But later the farms must pay it back. The collective farms can renew their seed every 4 years. Some of them get relatively small amounts and make their own increases for general use.

I am told that they get all the funds for this station from their own income and no government appropriations, except for the salaries of the scientists. I object to this method and point out strongly its dangers. I explain that I have seen too many times where stations financed in this way get a director who puts so much emphasis on income that he forgets the main purpose of the research station. Mr. Melnikov from the Ministry in Moscow says that this is an unusual arrangement and that he agrees with me fully.

Between 1:30 and 3:10 we have lunch, which is about par for the course, and then go to the Krasnoarmeisk Rice-Growing State Farm. The assistant manager of the farm greets us. He says that the farm was organized on the flat plains of the River Kuban in 1931. Some 1,100 hectares were reclaimed; and then in 1946, about 6,000 more were reclaimed. Now they have 13,000 hectares of which 10,300 are arable. He says they have 4,200 hectares of rice, 900 of corn, and 3,500 in fodder crops. They also have some orchards, especially cherries, and

meadows. Besides the crops they have 2,000 cattle of which 600 are milk cows, poultry, pigs, and bees.

Their total annual harvest of rice is 11,000 tons at an average of about 3 tons per hectare. Their aim is to produce 100 kilograms of rice per 10 man-hours.

They have 1,200 permanent workers plus 300 temporary workers during rice harvest. These are organized into brigades so that each brigade has about 600 hectares and each laborer has 30 hectares for irrigation. Each rice brigade has 20 laborers; but another brigade does the work with tractors and the combine harvesters. On the farm there are 110 tractors that work in 8-hour shifts, and 62 combine harvesters.

The 600 cows average 2,800 kilograms of milk. He says that they make more money from the milk, for the same amount of labor, than from the rice. They get 85 rubles for 100 kilograms of rice and 100 rubles for 100 kilograms of milk.

They also hope to increase their rice yields by better varieties, better fertilizers, and better methods of applying fertilizers. He says they apply 200 kilograms of ammonium sulphate with 18 to 20 percent nitrogen; 200 kilograms superphosphate with 25 percent P_2O_5 ; and 100 kilograms per hectare of potassium chloride, with 40 percent K_2O . This is applied before sowing, and then they add 100 pounds each of ammonium sulphate and superphosphate by plane at tillering time. (This superphosphate is certainly not needed.)

(Our host on the farm gets a bit confused in describing this practice and he has quite a little coaching from the experimental

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are milk cows, poultry, pigs, and hens.

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during rice harvest. These are organized into brigades so that each

brigade has about 500 hectares and each laborer has 30 hectares for

irrigation. Each rice brigade has 10 laborers; but another brigade

does the work with tractors and the combine harvesters. On the farm

there are 110 tractors that work in 8-hour shifts, and 52 combine

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of ammonium sulphate and superphosphate by plane at tillering time.

(This superphosphate is certainly not needed.)

(Our host on the farm gets a bit confused in describing this

practice and he has quite a little coaching from the experimental

station people. I am not at all sure that this is the actual practice on this farm.)

We do see some nice rice in the field of the Krasnodar 424 variety. They expect about 4 tons to the hectare. Still the assistant manager feels that their yields are too low.

We are then taken to the Michurin Collective Farm. They have much fruit. To get there we drive on a very rough road on the flood-protected plain of the Kuban River. Along the way I see hemp, corn for fodder, and poor pasture. This heavy soil is said to be flooded in years of high rainfall.

We arrive at 5 p.m. and are addressed by the chairman, Mr. I. V. Markovski. This farm was organized in 1950 by uniting four smaller ones. The basic farm of the 4 was organized in 1940. They now have 14,847 hectares of which about 10,000 are arable. This farm has 13 villages that include 2,300 families and a total population of 7,800 of which 3,600 are workers.

(Obviously many of the young men are away in the army or somewhere. I ask the chairman how many men were away in institutes, in the army, and etc. He replied that he had no way of knowing!)

We are given the following figures for crop areas, in hectares:

Rice	1,308
Orchards and vineyards	500
Winter wheat	3,427
Winter barley	300
Spring barley	258
Oats	805

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Rice	1,308
Orchards and vineyards	500
Winter wheat	3,437
Winter barley	300
Spring barley	258
Oats	805

Corn for grain	800
Corn for silage	1,100
Sunflowers	375
Hemp	121
Roots (mangel-wurzels)	125
Grasses	3,128, including
Alfalfa	796
Sudan grass	694
Spring and winter barley for pasture	696

He gives me the following figures on yields in tons per hectare:

Winter wheat	(1958)	3.27
Winter wheat	(1957)	2.52
Winter barley	(1958)	2.60
Winter barley	(1957)	2.94
Spring barley	(1958)	1.80
Spring barley	(1957)	2.30
Oats	(1957)	2.40
Corn for grain	(1957)	2.60
Corn for grain	(1955)	6.00
Grapes	(1957)	7.00

He says that not much of the fruit is yet in production. They planted 165 hectares of grapes in 1957 and 182 in 1958.

800	Corn for grain
1,100	Corn for silage
375	Sunflowers
121	Hemp
125	Roots (mangel-wurzel)
3,128, including	Grasses
796	Alfalfa
694	Sudan grass
690	Spring and winter barley for pasture

He gives me the following figures on yields in tons per hectare:

3.27	(1928)	Winter wheat
2.52	(1927)	Winter wheat
2.60	(1928)	Winter barley
2.94	(1927)	Winter barley
1.80	(1928)	Spring barley
2.30	(1927)	Spring barley
2.40	(1927)	Oats
2.60	(1927)	Corn for grain
6.00	(1922)	Corn for grain
7.00	(1927)	Grapes

He says that not much of the fruit is yet in production. They

planted 155 hectares of grapes in 1927 and 182 in 1928.

As of July 1, 1958, they had the following:

Total cattle	3,012
Milk cows	766
Hogs	5,500
Sheep	1,468
All poultry	68,000, including chickens, ducks, and geese.
Beehives	200

The average milk production in 1957 was 1,967 kilograms per cow. This year they are doing better and from January 1 to August 1 they had 1,400 kilograms per cow. Milk is delivered to the government except for that used for calves and some in homes. The government uses part of it for butter, part for cheese, and some for use as whole milk. The price per liter is governed by the butterfat content. Last year the average butterfat was 3.8 percent and they received 1.20 rubles per liter.

(Added later: Mr. Bulik understood 1.40 rubles instead of 1.20 but this seems too high to me.)

Of course the farm has a good many other milk cows if those of the individual family are included. These amount to about 2,300, not counting calves and heifers. He says the farm delivers 70 percent of its farm milk production to the government. I am told that the calves are weaned immediately and that the milk fed to them is counted in the total production.

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(Added later: I understand that the production of the private cows for which they have no records, is estimated by the government as the same as that of the farm cows for which they do have records. Probably this results in an estimate far too high.)

He gives me these figures on machinery:

Tractors	47
Combine harvesters that are pulled by tractors	13
Self-propelled combine harvesters	16
Trucks	30
Cars	2

He tells me that a new Minsk tractor, the MTZ-2 or Belorus, costs 18,200 rubles.

The average number of labor-days per family last year was 347. Each one was worth the following:

Rubles	11
Wheat	2 kilograms
Corn (grain)	700 grams
Rice	500 grams.

And each farmer is permitted to use what fodder crops he needs.

Last year on this farm they used 10,000 tons of manure and 650 tons of mixed mineral fertilizers.

A new brick shop is being made for machines.

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The average number of labor-days per family last year was 367.

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A new brick shop is being made for machines.

They take us to a field that was flooded before 1950 and that is now protected, drained, and irrigated. Here they have a good crop of rice. (K-2563)

Despite all the tractors and trucks, I see green fodder being hauled with oxen.

There seem to be so many children here I ask about the numbers and am told that they have 1,100 children in their nurseries.

We see some very nice grapes, for both table and wine. On these they use manure and superphosphate. They are pruned to 1 meter high with 8 to 12 branches per plant. (K-2564) Although now trained on wires, in the autumn they are taken down and laid on the ground so that earth may be plowed over them for winter protection. This is done in November and they are taken out in late March.

We are taken into the large wine cellar which has a capacity for 450 tons of wine. Of course we have to taste several kinds, but not every vintage of each kind!

I see some piles of "peat" bricks that are used for fuel. These are like those I had seen before but on close inspection I find they are actually made from manure, not peat. The small ones are for out-door fires and the large ones are for insulating the rooms to keep them warm in winter and cool in summer. We drive by some good corn that will run some 30 tons per hectare as silage.

We then drive up to a nice clubhouse with a theater and several meeting rooms. This is in a village on a border between two

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K-2563. August 3, 1958. West of Krasnodar. Rice field on Michurin Collective Farm.



K-2564. August 3, 1958. West of Krasnodar. Table grapes on Michurin Collective Farm.

K-2563

IX-11

K-2563. August 3, 1958. West of Krasnodar. Rice
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K-2564

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K-2564. August 3, 1958. West of Krasnodar. Table grapes
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collective farms and apparently they both use the clubhouse. So instead of going back to our hotel, late as it is, we remain for a banquet. Several courses are served with the usual vodka, cognac, and wine. Then long after we should have been through, a whole roast pig is brought in, and, of course, I have to make the first carving. Only with great effort almost bordering on discourtesy can I get our group away at 9 p.m. As we come out of the clubhouse I see a crowd of several hundred people waiting to see Americans and to greet us. I don't know how long they have been waiting. This had happened before today with smaller groups. There was even a large group at the clubhouse when we entered and at the winery.

I notice a great many bicycles in this village. It is Sunday, a rest day, and that may account for so many people being here.

One is somewhat overwhelmed by the genuine friendliness and gracious courtesy of these people. If anything, the people of the Kuban outdo those of Ukrainia. It is a great pity that a few million Americans could not have the same experience we are having.

On the way back home we have a small breakdown with the car which is quickly repaired.

After a wonderful day I am ready for bed at 11:00 p.m.

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August 4

I am up at 6:15, pack, and go out into the park. I sit in the park while many people pass. Obviously they are curious but do not stare because that would be discourteous.

Sitting here in this pleasant park it is hard to appreciate that this city was destroyed by the Germans and again rebuilt since 1945. No wonder that every citizen here is most deeply concerned that the Germans should never get another chance. It is not hard to blame them for wanting a buffer zone and for insisting that Germany remain divided and weak.

We have breakfast and leave for the airport about 10 a.m. I get the propaganda bulletins on shelterbelts in this Krai that I asked for yesterday. They tell me that where the soil is likely to blow it is best to space the windbreaks at distances 25 times the height of the trees. Since a full-sized poplar is 30 meters high the belts can be 750 meters apart. With thick undergrowth in the belt they insist that the effectiveness is reduced by 15 percent. They insist upon 70 centimeters from the ground to the first branch for some air to pass. In fact, with shrubs and thick undergrowth their formula becomes 15 times the height of the trees.

We have tea in the airport as guests of its director. The wheels are up for Stalingrad at 11:25.

(Eddie Baranov suggests that I read Battle on the way by Galina Nikolaeva. But he doesn't know whether it is in English or not.)

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Only here and there, and mainly for fruits and vegetables, are the windbreaks as close as just recommended to me. But I do see a few that conform on some grain farms. In many places, long irregular ponds have been made by dams on the most nearly permanent streams; but there are few attempts to make ponds in the uplands. Since most of the villages are near these irregular ponds, I assume they furnish the water supply.

We reach the Don River south of Rostov and turn northeast toward Stalingrad. There are many meanders in the old flood plain, some uncropped wasteland, and irregular fields. The plain above the flood plain is weakly dissected by a few narrow ravines. Some of these have nearly barren sides with mildly active gullies cutting back a few hundred yards. Within some of these natural ravines are dams for water storage. There are relatively few shelterbelts.

As we go along the relief increases and I see more erosion, both gully and sheet. This worsens as we go east. Then too, some fields show small spots, thick on the ground, that may have been caused by shells. Here ravines have much accelerated erosion and many gullies. But I see no diversions, badly as they are needed.

I call this to the attention of Melnikov. He says that they don't need to worry about this erosion: they have plenty of soil and no time now for erosion control. Anyway, he says, such soils that erode are not used for crops, only for pasture. Yet it is plain to see that the farmers are using the soils for cereals and other crops right up to the very boundaries of these gullies. No supporting structures can be seen from the plane in the large non-cropped areas. But I doubt

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that grasses and trees can stabilize the active gullies. I see few windbreaks.

As we cross the Don where it swings north, I see a body of low sand dunes on the eastern side of it.

Again I see these irregular spots and streaks in the field which have probably resulted from the war. Some have called this "war soil erosion." As we approach Stalingrad I see many scars from shells and trenches near the city.

We are down at 3:09 p.m. (Stalingrad time) and are met by several local officials and scientists. We drive 19 kilometers to the city. There are young shelterbelts along the road. It is bright, sunny, and hot.

We go to the Intourist hotel in the heart of the city, which is adjacent to a rebuilt department store used by General Paulus as his headquarters just before his surrender.

After a long wait we have a kind of lunch and dinner and at 6:10 go for a drive. The city stretches some 40 miles along the west side of the Volga but is quite narrow. The rainfall is only 220 to 240 mm. (about 9 inches). Several natural ravines have developed by cutting back from the Volga. The soil appears to be a fine sandy loam in the light Chestnut (Brown) group. Essentially all of the city was razed and completely replanned.

My guide, Mr. Larin, chief agricultural administrator for the Stalingradskaya Oblast says that this is light Chestnut soil and that about 50 to 60 percent of it is in some transitional stage toward Solonetz.

that grasses and trees can stabilize the active gullies. I see
few windbreaks.
As we cross the Don where it enters north, I see a body of
low sand dunes on the eastern side of it.
Again I see these irregular spots and streaks in the field which
have probably resulted from the war. Some have called this "war soil"
exposed. As we approach Stalingrad I see many scars from shells and
franchises near the city.
We are down at 3:00 p.m. (Stalingrad time) and are met by several
local officials and scientists. We drive 19 kilometers to the city.
There are young shelterbelts along the road. It is bright, sunny, and
hot.
We go to the Incomunist hotel in the heart of the city, which is
adjacent to a rebuilt department store used by General Pavlov as his
headquarters just before his surrender.
After a long wait we have a kind of lunch and dinner and at 6:10
go for a drive. The city stretches some 40 miles along the west side
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My guide, Mr. Larin, chief agricultural administrator for the
Stalingradskaya Oblast says that this is light Chestnut soil and that
about 50 to 60 percent of it is in some transitional stage toward Solonchak.

At the edge of the city we pass good-sized areas with contour terraces planted to forest trees. I am told that they do have many sharp showers here.

They take us to Mamaev Hill, the highest elevation in the city and the key point in the battle of Stalingrad. (K-2652) The battle waged back and forth; but finally the Russians took it firmly with fresh troops. At the same time they crossed the Volga in force south of the town and completely enveloped the German army.

A huge "green belt" is planned as a great semi-circle to the west of the city. It will be about one to three miles wide and over 40 miles long. Terracing of the slopes is necessary and at first the trees will require some irrigation. An enormous amount of work remains to be done, including land smoothing, terracing, and removal of rubble and temporary buildings. In some places they are using a small shrub, an Artemesia locally called wormwood, for cover without irrigation.

In rebuilding the city they apparently started at the river bank and are gradually working back, except for a few new apartments rather far from the river. The back streets and roads are quite bad indeed, especially near the ravines. Some of these are deep canyons and in the bare walls one can see clearly old buried soils of earlier geologic age.

In the favored places the old land is smoothed, terraced at a very slight angle to the contour (about 1 meter per km.), and planted to fruit trees, including cherries, apples, and others. These are irrigated by pumping from pools behind small dams. The water is carried to furrows by "portable" iron pipe. (It is a good thing that

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the Russian women who have to move this pipe are very strong.)

On the higher and steeper slopes, terraces for forest trees are made at a slight angle to the contour. (K-2653)

The terracing and land smoothing runs about 2,000 rubles per hectare and the planting another 1,500 rubles.

At dark I am back to the hotel and very tired. After a cup of tea and a bath I go to bed.

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K-2652. August 4, 1958. Stalingrad. Looking from Mamaev Hill, east of southeast over part of Stalingrad and down the Volga.



K-2653. August 4, 1958. Stalingrad. Terracing of slopes for tree planting in "green belt" around the city.

K-2652. August 4, 1958. Stalingrad. Looking from Mamaev Hill,
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K-2653. August 4, 1958. Stalingrad. Terracing of slopes for
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August 5

I take a walk at 6:30. It is cloudless and warm. The windows of the department store nearby have things that seem reasonable in quality and price. The flowers and trees here in the parks don't look very happy. With this kind of soil and with this rainfall the gardeners have a real job. Early in the morning one sees a few women carrying heavy buckets suspended from a wooden yoke across the neck and shoulders. Of course, this is common in the villages.

We have breakfast and leave at 9:05 for the Stalingrad Agricultural Educational Institute under the Ministry of Agriculture for the USSR in the southern part of the city. We drive through a large area of small homes of industrial workers. Some of the houses are not bad but the yards are helter-skelter. Most are surrounded by uneven and unpainted board fences.

As we go into the Institute I notice a good many attractive young women; but I don't suppose their appearance is a qualifying factor. Professor Prostakov, professor of soils, shows us many monoliths of light Chestnut soil and Solonetz. Apparently any soil here with evidence of some clay accumulation in the B and firm to hard prismatic structure is called Solonetz. I see now that I have underrated the productivity of many areas in the Soviet Union by reading their soil maps in terms of our classification. In the United States we do not call a soil a Solonetz until it has a considerably stronger profile influenced by exchangeable sodium; and consequently a very difficult soil to manage. He says that proper cultivation can reduce the

August 2

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exchangeable sodium from 20 to 5 percent. This involves deep plowing to 60 centimeters and washing with 5,000 cubic meters of irrigation water per hectare per year. (I am quite persuaded, perhaps incorrectly, that this Soviet system for soil classification has become so classical that they simply assume that what is called a Solonetz has 20 percent exchangeable sodium. I feel certain that many do not have anything like this much.)

He tells me that they use a species of elm widely in shelter-belts here.

With irrigation, he recommends alfalfa as a soil improving crop. With 6,000 cubic meters of water per hectare, applied in 5 doses per year they can get 30 tons of hay. (I am sure that is not an average.) In his experiments he says he gets 1.2 tons of wheat per hectare on a well-managed soil without irrigation as contrasted to 0.5 tons without improvement. This improvement involves also 5 to 12 tons per hectare of gypsum or its equivalent in waste from paper manufacture. This is only for the most solonetzic soils. For the best results with the solonetzic light Chestnut they try to plow the A horizon, the B horizon, and the lower B horizon without mixing them.

He shows me soil maps of collective farms and I try to photograph one of them. (K-2567)

This institute was started during the war. They have 33 chairs grouped in 4 faculties:

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1933. August 2, 1933. Stationary. Agricultural Experiment Station. Soil map of collection 1933.

K-2567

IV
1

1. Agronomy,^{a/} including applied soil science or agrology
2. Animal husbandry
3. Mechanical engineering
4. Electrical engineering

They have 2,500 resident students and 1,500 correspondence students who must spend one month each year here for lectures and examinations. Some of these are older men and women of the farms who are trying to get ahead with the use of their evenings, rest days, and annual leave.

The staff of 200 includes now 15 professors, 75 masters candidates, and 120 assistants. They have an experimental farm of 25,000 hectares where resident students do practical work. Some do their practice on collective farms. The course requires 5 years, after the 7-year school or the 10-year school. The staff does some research as well as teaching. About 50 to 70 percent of the students come from the Stalingradskaya Oblast and the rest from other oblasts. They accept about 375 new students by examination from about 1,400 applicants. About half of the students in agronomy and animal husbandry are girls; but only 5 percent in engineering are girls. They will soon be prepared to accept 500 new students when their building program is completed.

^{a/}One needs to realize the strong contrast between an institute and a university. The only agricultural subject in which one may get a university degree is soil science (or pedology in the USSR.) An agriculturist can get a university degree in engineering, or in botany or zoology with specialization in pathology, physiology, or genetics. Thus "agronomy" is a kind of applied or technical course taught with the minimum of basic science as is done in many American land-grant colleges, with little or no foreign language, calculus, or advanced chemistry.

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(I can't quite account for the total student body unless there are some transfers.) Of the resident students, 1,000 live at home in or near Stalingrad, 500 board in private homes, and 1,000 live in dormitories. Eighty percent are from farms and factories. Resident students who pass their examinations are paid stipends that cover their costs.

We leave at 10:26 to visit the All-Union Scientific Research Institute of Agro-Forest Amelioration. Here we meet:

1. Albenki, Anatolii Vasilevich - Vice Director of the Scientific Section of the Institute. Professor. Doctor of Agricultural Sciences. Corresponding Member of the All-Union Academy of Agricultural Sciences named after Lenin.
2. Koblev, Yurii Nikanorovich - Vice Director for Production.
3. Gorin, Timofei Ivanovich - Director of the Laboratory for Fruit and Grape Growing. Candidate of Agricultural Sciences.
4. Tsekhmistrenko, Petr Efimovich - Senior Scientific Worker. Candidate of Agricultural Sciences. Stalin Prize Winner.
5. Fedorenko, Varvara Petrovna - Junior Scientific Worker. Soils Laboratory.
6. Rastorguev, Leonid Ivanovich - Junior Scientific Worker in the Section of Soil Erosion Control. Candidate of Agricultural Sciences.
7. Golyato, Georgii Onufrievich - Director of the Laboratory for Plant Protection. Candidate of Agricultural Sciences.
8. Debelyi, Andrei Semenovich - Director of the Section for Extension Service. Candidate of Agricultural Sciences.
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The vice-director for science, Mr. Albenski, talks to us. He has a lovely beard but no moustache. Work is being done on afforestation. This was recently shifted from Moscow to Stalingrad. The buildings and a whole scientific village are under construction. Now they are concentrating on three problems:

1. Planting shelterbelts to protect fields on flat or undulating soils.
2. Soil erosion control.
3. Planting forests on sandy soils so they may be cultivated in the future, if needed.

The Institute has experimental stations and farms in many parts of the country, including Altay, the Volga region, Rostovskaya, Stavropol Krai, Orlovskaya Oblast, and several others. Besides, they carry out work on state and collective farms in western Siberia and elsewhere on virgin soils. They work with the local station at Akmolinsk which we will visit.

In addition, the republics have stations on amelioration. This Institute, which comes under the Lenin Agricultural Academy, cooperates with those of the republics.

It is plain that they are using forest in a broad sense to include fruit- and nut-bearing trees and even grapes.

Here it gets down to -40°F . and the grapes must be covered with earth. They have cherries that grow without irrigation but the other fruits require extra water. Fruits can be grown nearly 1,500 kilometers to the east. Fruit growing is increasing and some farms here specialize

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in it. (This is another indication of local self sufficiency, partly because of poor transport.) There are 18 nurseries in the Stalingradskaya Oblast under its agricultural administration. Young saplings of 2 years cost 3.5 rubles and one-year old ones 1.5. Currants and gooseberries cost 1.5 rubles. Strawberries are 5 kopeks per plant. Many collectives have their own nurseries.

In the field we see grapes trained 7 feet high that must be taken down and covered with earth.

I look at a Meadow-Chestnut soil on an old terrace of the Volga River which is under orchard. The surface is nearly level.

- | | | | |
|------|---------------------|-----------|--|
| I. | A _{p1} | 0 - 6" | Very dark grayish-brown (10YR 3/2) heavy fine sandy loam, which digs out in easily friable clods. pH is said to be 7.2. |
| | A _{p2} | 6 - 7" | Undecomposed organic matter from sawdust mulch plowed down. |
| | A ₁₂ | 7 - 13" | Very dark grayish-brown (10YR 3/2, uncrushed; (10YR 3/3, crushed) fine sandy loam. Digs out in easily friable clods. Worm holes abundant. The wavy lower boundary goes to 18 inches. |
| | A ₃ | 13 - 26" | Dark brown (10YR 3/3) sandy loam to fine sandy loam. Digs out in easily friable clods. Nearly massive in place. Moist now and firm in place. |
| II. | A _{1b} | 26 - 30" | Very dark grayish-brown (10YR 3/2) fine sandy loam. Firm in place, but digs out in easily friable clods. |
| | A _{3b} | 30 - 37" | Brown (10YR 5/3) nearly loose laamy sand. |
| III. | A _{1bb} | 37 - 47" | Very dark grayish-brown (10YR 3/2) easily friable clay loam. Very weak, very fine granular; friable; moderately plastic. |
| | B ₂ or C | 47 - 50 + | Brown (10YR 4/3) light sandy clay loam. Massive but easily removed; friable. |

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The pH of the surface soil is said to be 7.2 or 7.3. They need to use iron sprays here to control chlorosis.

We go from the second river terrace with the irrigated orchards and vineyards to the so-called Volga Hills. They have cherries on the lower slopes and rotations on the middle slopes with 4 years of annual grass and 2 years of spring cereals. Relatively small fields are separated by shelterbelts that serve for run-off control and for collecting snow. I also note some basin furrows in the fields. I look at a representative shelterbelt and photograph it from the north side with Mr. Melnikov. (K-2568) There are 10 rows of trees including oak, ash, elm, and others not identified, along with currants and other shrubs.

We hurry to the bank to cash some checks, have a slow lunch, and leave the hotel at 3:05 to visit a collective farm, Fortieth Anniversary of October. We drive generally south. It is hot and very dusty on these earth roads. The city is built irregularly along the river. There are narrow places and even a few gaps. Some areas are wet and salty where there are no buildings except for factories on the bank of the river. We are taken to the place where the Volga-Don canal joins the Volga. There are 13 locks on this canal. (K-2569)

I am quite irritated at our hosts for wasting an hour at this place. Even then I have trouble to get them going. I am even more irritated when I see how much we went out of the way in the cars.

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K-2568. August 5, 1958. Near Stalingrad. North side of shelterbelt: oak, ash, elm, and other trees; and currants and other shrubs. (V. M. Melnikov).

K-2524

8-14

August 2, 1958. Near Stealing. North side of
shelterbelt: oak, ash, elm, and other trees; and
countryside and other shrubs. (V. M. Melnikov).



K-2569. August 3, 1958. South of Stalingrad.
First lock in the Volga-Don Canal.

K-2569.

A.

K-2569. August 3, 1958. South of Stalingrad.
First lock in the Volga-Don Canal.

We drive southwest along the edge of the Canal and are soon in a treeless landscape of light Chestnut soil. We cross to the south side of the Canal. Some of the soil along here is not cultivated, perhaps to protect the Canal. Back from it I see cereal stubble, corn, meadow, corn, and then a huge field of cereal stubble. The stubble and straw suggest about 2 tons per hectare. I see some irrigated vegetables, melons between corn rows, cabbage, alfalfa, hay, and a very large field of cereal stubble. I note piles of snow fences along the road. My guide says this is a temporary arrangement while the shelterbelts are low. They are more than "low;" I have not seen any along there. Some sheep are said to graze the uncultivated steppe which has much of this Artemesia that I saw last evening. Then we come again to irrigated vegetables, including cabbage, tomatoes, and beets that are supplied water by pumping from the Canal.

We come to the collective farm, Fortieth Anniversary of October, at 5:15 p.m. This is a new farm near a reservoir on the Volga-Don Canal. The chairman is a big, handsome bachelor named Chinchinkovski. He lost an arm in the battle of Leningrad.

He tells us that the farm has a total area of 7,000 hectares. Eighty-five percent is cultivated and 15 percent is in grass because of gullies. This farm was actually founded elsewhere and moved only 5 years ago to this new place because the old farm was flooded by the reservoir. There are 220 families and 400 laborers. The chairman says he needs more workers but I don't believe it. Workers are 60 percent women and 40 percent men.

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We come to the collective farm, Fortlet Anniversary of October, at 2:15 p.m. This is a new farm near a reservoir on the Volga-Don Canal. The chairman is a big, handsome bachelor named Chichinkovski. He lost an arm in the battle of Leningrad.

He tells us that the farm has a total area of 7,000 hectares. Eighty-five percent is cultivated and 15 percent is in grass because of gullies. This farm was actually founded elsewhere and moved only 5 years ago to this new place because the old farm was flooded by the reservoir. There are 320 families and 400 laborers. The chairman says he needs more workers but I don't believe it. Workers are 60 percent women and 40 percent men.

Fifteen hundred hectares are irrigated with water from the Volga-Don Canal. Most of this seems to be used for vegetables and some corn. The government paid the costs for irrigation and make no charges for the water. Besides they have grain without irrigation and animal husbandry. They have no shelterbelts but they are in the plan.

The chairman says they have machinery for all operations, purchased from the government, including 20 tractors, 11 combine harvesters, and 13 trucks and cars.

(I get the firm impression that this man got his job as chairman because he was a wounded veteran and a good party member, not because of his skill as an agriculturist.)

I am told that they have bad dry winds from the southeast and cold ones from the northwest in winter.

There are 2,000 hectares of spring wheat. He gives us three yields in tons per hectare: 1955, 1.0; 1957, 0.6; and 1958, 1.2. (Probably 1956 was a failure.)

They have 500 hectares of corn for silage and 1,000 hectares of barley that gave 1.5 tons per hectare.

They have 200 milk cows and the plan calls for 350. In 1957, they had 2,000 liters of milk per cow and between January and August 1958, they had 1,500 liters. With better feeding, including more corn and more alfalfa-sudan hay (irrigated), they expect to have an annual average of 2,500 liters. They have 700 hogs, 10,000 chickens, 5,000 ducks, and 30 horses.

Fifteen hundred hectares are irrigated with water from the
Volga-Don Canal. Most of this seems to be used for vegetables and
some corn. The government paid the costs for irrigation and make
no charges for the water. Besides they have grain without irrigation
and animal husbandry. They have no shelterbelts but they are in the
plain.
The chairman says they have machinery for all operations, pur-
chased from the government, including 20 tractors, 11 combine
harvesters, and 13 trucks and cars.
(I get the firm impression that this man got his job as chairman
because he was a wounded veteran and a good party member, not because
of his skill as an agriculturist.)
I am told that they have had dry winds from the southeast and
cold ones from the northwest in winter.
There are 2,000 hectares of spring wheat. He gives us three
yields in tons per hectare: 1925, 1.0; 1927, 0.6; and 1928, 1.2.
(Probably 1926 was a failure.)
They have 200 hectares of corn for silage and 1,000 hectares of
barley that gave 1.2 tons per hectare.
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and more alfalfa-sudan hay (irrigated), they expect to have an annual
average of 2,500 liters. They have 700 hogs, 10,000 chickens, 2,000
ducks, and 30 horses.

I try to get the rotations but I have some doubts about the accuracy of my notes since the chairman gets a lot of prompting from his agronomist, his bookkeeper, and the men from the oblast.

The seven-year rotation for irrigated areas:

1. Perennial grass, mainly alfalfa
2. Tomatoes
3. Cabbage
4. Spring cereal
5. Potatoes
6. Clean fallow
7. Onions and carrots

This is apparently flexible and individual plots are changed according to the season. On the dry land, he says, they have one year of cereals, then occupied fallow, and again back to cereals. He says they have corn, millet, barley, or sudan grass on the occupied fallow.

They have 40 hectares of orchard plantings 2 and 3 years old. The plan calls for 300 hectares of apples, pears, plums, and cherries.

Last year 60 percent of the income was from vegetables, including cabbage, tomatoes, cucumbers, summer squash, melons, and watermelons.

The income for a standard labor-day unit last year was a total of 12 rubles, counting both cash and kind. (See later what the bookkeeper says.) Each family has .25 hectares of irrigated land. They expect 1958 to be much better. Then too, the individual families have cows that are grazed in the non-irrigated pasture.

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accuracy of my notes since the chairman gets a lot of prompting from his agronomist, his bookkeeper, and the men from the oblast.

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The vegetables and milk go mainly to Stalingrad. As usual, they sell 70 percent of their production. They receive 1.2 rubles per liter.

Now he gives me a rotation for the non-irrigated land with so much prompting and hesitation that I don't believe he is really following any rotation despite the plan:

1. Crested wheatgrass
2. Crested wheatgrass
3. Spring grain
4. Spring grain
5. Millet
6. Corn for silage
7. Spring grain
8. Barley
9. Winter rye for occupied fallow

So far they do not use fertilizers on the unirrigated soil except, he says, for side dressings on corn. Until now they haven't used fertilizer on the irrigated soil but have just purchased 500 tons of superphosphate. Farm manure is used only in hot beds.

This farm is organized into brigades and these into teams. Each team has a specific area to look after.

As we leave for the field I ask Mr. Bulik to remain with the bookkeeper to see if he can get some reasonable records. (He tells me later that this took quite a lot of consulting and digging into books.)

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His table follows:

	1955			1957			1958		
		Yield			Yield			Yield	
Crop	Hectares	C/HA		Hectares	C/HA		Hectares	C/HA	
Spring									
Wheat	2,000	8		2,000	7		1,800	15	
Winter									
Rye	840	10		335	8		450	16	
Barley	770	15		700	5		900	14.5	
Tomatoes	20	223		30	145		-	-	
Cabbage	34	180		18	140		-	-	
Annual									
Grasses	320	30		40	9		-	-	
Corn	138	23		110	40		-	-	
Perennial									
Grasses	-	-		100	10.5		-	-	
Orchards	-	-		60	-		-	-	

Earnings per labor-day in 1957 were: 2 kg. grain, 0.5 kg. vegetables and 4 rubles.

The head bookkeeper says that 1956 was a poor year. The farm is 83 kilometers from Stalingrad in the Gorodishenski Rayon. As of June 1, 1958 the livestock numbered:

163 milk cows, with an average milk production from January 1, to June 1, 1958 of 670 liters.

170 forage cows

525 hogs, of which 25 are sows

We go into the field. The soils are light Chestnut (Brown) of varying degrees of Solonetz influence. Plowed fields have a slight reddish color. Irrigated home plots have sunflowers, vegetables, corn, and a few flowers.

and a few flowers.

reddish color. Irrigated home plots have sunflowers, vegetables, corn, varying degrees of Solonchak influence. Plowed fields have a slight We go into the field. The soils are light Chestnut (Brown) of

255 hogs, of which 25 are sows

170 forage cows

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1928 the livestock numbered:

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and 4 rubles.

Earnings per labor-day in 1927 were: 2 kg. grain, 0.5 kg. vegetables

Crop	1928	1927	1926
Wheat	2,000	2,000	1,800
Barley	770	700	900
Winter	840	335	450
Spring	8	7	12
Tomatoes	20	30	-
Cabbage	34	18	-
Annual	320	40	-
Grass	138	110	-
Perennial	-	100	-
Orchards	-	60	-

His table follows:

I go out and look at the tomatoes. The plants are quite small. Many of the fruits are small and pear shaped. They have an irregular slip-shod irrigation system. (K-2570; K-2571; K-2572) It is a good thing they don't have to pay for the water; or perhaps if they did they might do a better job. They claim 25 to 30 tons per hectare, with prompting from our guides, but the crop doesn't look that good to me.

Then we look at the corn from which they expect between 20 to 25 tons per hectare for silage; but it looks hardly that good to me. We have an interesting confusion here. Some say it has been irrigated but the chairman says not. He says they made the irrigation furrows but that it rained and they didn't need to use them!

I look very hurriedly indeed at the solonetzic soil. Locally this is called a Solonetz in the light Chestnut zone. We would call it a solonetzic Brown soil.

A ₁	0 - 4"	Reddish- to grayish-brown, granular silty clay loam, with surface one-half inch of granular mulch.
B ₂	4 - 10"	Dark brown (7.5YR 3/4) clay with moderate to strong prismatic structure. Fairly easily friable.
B ₃₁	10 - 16"	Brown (7.5YR 5/3) weak, coarse prismatic clay. Firm.
B ₃₂	16 - 42"+	The soil gradually fades to light brown (7.5YR 6/3) silt loam; weak, coarse prismatic. Soil digs out in coarse hard-to-crush blocks.

The soil has carbonates below 10 inches. The surface is gently sloping but cut here and there with natural ravines. The soil has a nearly complete cover of grass and Artemesia (unidentified species.)

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I look very hurriedly indeed at the solonchak soil. Locally this is called a Solonchak in the light Chestnut zone. We would call it a solonchak Brown soil.

A ₁	0 - 4"	Reddish to grayish-brown, granular silty clay loam, with surface one-half inch of granular muck.
B ₂	4 - 10"	Dark brown (7.5YR 3/4) clay with moderate to strong prismatic structure. Fairly easily friable.
B ₃₁	10 - 16"	Brown (7.5YR 5/3) weak, coarse prismatic clay. Firm.
B ₃₂	16 - 42" +	The soil gradually fades to light brown (7.5YR 6/3) silty loam; weak, coarse prismatic. Soil digs out in coarse hard-to-crush blocks.

The soil has carbonates below 10 inches. The surface is gently sloping but cut here and there with natural ravines. The soil has a nearly complete cover of grass and Artemisia (undoubtedly species.)



K-2570. August 5, 1958. South of Stalingrad. Irrigated tomatoes on Fortieth Anniversary of October Collective Farm.



K-2571. August 5, 1958. South of Stalingrad. On Fortieth Anniversary of October Collective Farm. Cracking along irrigation furrow of solonetzic Brown soil. (Tomato).

8-2570

A-2

K-2570. August 2, 1958. South of Stalingrad. Irrigated
tomatoes on Forsteth Anniversary of October Collec-
tive Farm.

A-3

K-2571. August 2, 1958. South of Stalingrad. On Forsteth
Anniversary of October Collective Farm. Cracking
along irrigation furrow of solonchak Brown soil.
(Tomato).



K-2572. August 5, 1958. South of Stalingrad. Field workers on Fortieth Anniversary of October Collective Farm.

K-2572

2-1-A

K-2572. August 5, 1958. South of Stealing. Field workers on
Forteth Anniversary of October Collective Farm.

Too bad that it is nearly dark now.

Here I was told that one collective farm in this area growing sheep had such a good income that the workers received 10,000 rubles apiece and the chairman 100,000 rubles.

Now we go to dinner on the farm with abundant food, drinks, and toasts. (I am reasonably certain that the supervisory waitress works in our hotel in Stalingrad.)

We leave at 9 p.m. for the long trip back to the Intourist hotel. I am in my room and very tired at 10:30.

This has not been one of the good days. I believe the Oblast officials have given us rather more from plans than performance. Actually I think they expect more from these soils of a semi-arid climate than can be delivered with current practices. They talk a lot about terraces and diversions but except for the "green belt" around Stalingrad they are rare. (Added later: Nor did I see any from the plane the next day.)

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from the plane the next day.)

August 6

We are up at 5:20 a.m., pack, and leave for the airport at 6:15. Marlin is ill. The others have been ill for a little bit except for the interpreter and me. I can only hope that my luck holds out.

This is a lovely, dry, warm morning. On the way to the airport we pass much unoccupied land with micro-relief from the war. We pass a section of the "green belt" with trees about 5 to 8 feet high. There is an outside row of Russian olive. The trees include a narrow-leaved elm, ash, some poplar, wild apple, and a few other unidentified sorts.

A very few minutes after arrival at the airport the wheels are in the air for Moscow at 6:58 a.m. local time or 5:58 Moscow time.

In the fields I see trenches and shell holes still being worked around by the farmers. Many hectares need land smoothing by bulldozers. But more important, diversions and small structures are needed to stop the growth of gullies. Not a great deal would be required, except very near the river; but plants alone will not do the job. More contour stripcropping should be planned near the ravines and small streams. On some parts of the escarpments near the streams I see mildly developed badlands that could be controlled with diversion terraces and chutes and protection against grazing. (I shall need to say, however, that I have seen very little overgrazing.)

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In about 100 miles we are over dark Chestnut soils that are nearly all cropped, except near the fairly well vegetated shallow ravines. I see cereal stubble, sunflowers, meadow, fallow, and quite a few young shelterbelts and young tree plantings along the margins of shallow ravines and at the heads of gullies where we would recommend diversions. Here too, farmers plow around some old military diggings and possible deep shell holes. A few ponds have been made along the streams.

I see patches of natural forest and we are moving into Chernozem, Here near the drainageways I see some rather bad erosion problems that will not be solved by vegetation alone. (7:47 a.m.).

The land is greener now and quite densely populated as we pass into the "forest steppe zone." (8:15 a.m.)

Then we have clouds. Ordinary planes like this take 24 passengers. They are similar to many in the United States but have no seat belts and apparently serve no breakfast tea. I have 1½ glasses of tea in my room and 2 apples; but that hardly takes care of the problem.

As we approach Moscow about one-fourth to one-third of the land is forested. The landscape resembles the northern part of our Gray-Brown Podzolic zone.

The wheels are down at 9:10 Moscow time. We leave some of our books and I leave soil samples with the Assistant Agricultural Attaché, who comes to meet us; but he forgot to bring our mail! Then we have a bit of breakfast.

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who comes to meet us; but he forgot to bring our mail! Then we have
a bit of breakfast.

About 11 a.m. we board the big jet plane for Tashkent. The wheels leave the ground at 11:27. This is a very smooth plane. We fly a little above 30,000 feet at around 550 to 600 m.p.h. For some reason they have seat straps and the hostess insists they be fastened. I have no idea why.

For the first hour out of Moscow we are above solid clouds. Then they break but it is a bit hard to see at this elevation. Nearly all the land is cultivated except along the fairly well-trenched, winding drainageways. Here too, many gullies are working back into what appears to be an undulating plain. This looks like moderate accelerated erosion. Diversion terraces would probably control this and conserve a lot of water. I guess that more than one-half the land has cereal stubble.

Then clouds again! Later, we go over dissected, rolling desert land and soon (1:37 p.m.) cross the northern boundary of the Aral Sea. I see few signs of human occupation along the coast from this great height. The Syr-Darya River (equals "quite river") is very muddy and has a considerable delta where it empties into the sea.

The desert to the south and east is undulating to rolling. There are some playas but it is too hazy to see clearly. In places a few small irregular fields have been cultivated. I see a few animals, probably camels. Some areas appear as pale reddish-yellow, nearly barren, stony, hilly soil. Then clouds over this desert! At 2:27 p.m., presumably some 30 minutes out of Tashkent, we are over a nearly level

presumably some 30 minutes out of Tashkent, we are over a nearly level barren, stony, hilly soil. Then clouds over this desert! At 2:37 p.m., small irregular fields have been cultivated. I see a few animals, are some places but it is too hazy to see clearly. In places a few The desert to the south and east is undulating to rolling. There and has a considerable delta where it empties into the sea. height. The Syr-Darya River (spelled "quite river") is very muddy I see few signs of human occupation along the coast from this great land and soon (1:37 p.m.) cross the northern boundary of the Aral Sea. Then clouds again! Later, we go over dissected, rolling desert one-half the land has cereal stubble. control this and conserve a lot of water. I guess that more than moderate accelerated erosion. Diversion terraces would probably back into what appears to be an undulating plain. This looks like trenched, winding drainageways. Here too, many gullies are working. Nearly all the land is cultivated except along the fairly well- Then they break but it is a bit hard to see at this elevation. For the first hour out of Moscow we are above solid clouds. they be fastened. I have no idea why. For some reason they have seat straps and the hostess insists We fly a little above 30,000 feet at around 550 to 600 m.p.h. wheels leave the ground at 11:27. This is a very smooth plane. About 11 a.m. we board the big jet plane for Tashkent. The

undissected, grayish-brown desert with a few salty playas and shallow stream beds. Six minutes later I see a few fields and some dwellings. There is a green strip along the Syr-Darya River; and then again back into desert. Our pilot is dropping the plane so we must be nearing Tashkent a little ahead of schedule. The trip is supposed to take 3 hours and 25 minutes.

Now I see more cereal fields in nearly level favored places. These are laid out in huge rectangles in clear divisions. These are few however since the relief is quite choppy. I see several large flocks of animals that are probably sheep, and more roads.

As we come near the ground the land is completely dissected but the slopes are rounded and essentially stabilized. Perhaps the desert I have just passed over has a similar choppy mezzo-relief. Then I see two more of these large fields with cereal stubble. I should think that some of the grain would need to be cut by hand because of the mezzo-relief.

At 2:45 we are over a partially irrigated soil with villages; but except for the flood plains along local streams, the uplands have this bold mezzo-relief. Next we pass over dryland cereal stubble and grazing land in front of a large area of irrigated soil.

The wheels are down at 2:53, which is 5:53 Tashkent time.

We are met by a large delegation including representatives of the Ministry of Agriculture of the Uzbek Republic.

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It takes quite a while to get our baggage, which reminds me of the Washington airport. We get into an Intourist bus for the hotel at 6:26.

There are many trees along the streets. Water flows in small narrow ditches between the roadway and the sidewalk. These ditches supply water to the householders and serve to carry away the refuse after the custom in the Near East.

It is warm but not hot today. Yesterday it was 104°F. But I explain that the Americans always bring good weather - dry weather for Minsk and cool weather for Tashkent.

The railway station and many other buildings are painted a pale pea-green, although some are white or yellow. The majority of the people on the street are dressed like those in Russian cities although a few wear the typical Uzbek skullcaps.

We are assigned rooms at the Tashkent hotel where we have a quiet dinner. I take a brief walk and go to bed.

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August 7

I am up about 6:30 and go for a walk in the main square where a beautiful theater and opera house called Alisher Navoi, is nearly completed. (K-2573) As in Russian cities women are out early sweeping the streets and sidewalks. Mainly they sweep up the fallen leaves and twigs. (K-2574) Citizens of the Soviet Union drop very little rubbish on the streets, only a small fraction of that dropped by American citizens. After 2 or 3 days in the country one doesn't even drop burnt matches on the sidewalk.

After breakfast we have a short wait for our hosts and are then taken at 10:25 to the Ministry of Agriculture of the Uzbek Republic. Our hosts include the Vice-Minister, Mr. Igamberdyev; the Vice-Minister of Water Economy, Mr. Korzhavin; the Director of Research in the Institute of Irrigation, Mr. Nadzhimov; the senior scientific worker in soils at the Academy, Mr. Umarov; the director of research on fertilizers, Mr. Popov; and the chief of economic planning in the Ministry of Agriculture, Mrs. Kuznetsova.

This Republic has an area of 409 square kilometers with 9 oblasts in it. The Fergana Valley, east and a little south of Tashkent is called the, "Diamond of the Republic."

The land area is summarized as follows:

Total agricultural land	45,000,000 hectares
Collective farms	14,000,000 hectares
State farms	10,000,000 hectares

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K-2573. August 7, 1958. Tashkent. Theater,
Alisher Navoi, in Central square.



K-2574. August 7, 1958. Tashkent. Central square
in early morning.

K-2573

K-2573. August 7, 1958. Tashkent. Theater,
Alisher Navoi, in Central square.

K-2574

K-2574. August 7, 1958. Tashkent. Central square
in early morning.

Government reserve	21,000,000 hectares
Arable land	3,660,000 hectares
Irrigated land	2,513,000 hectares
Upland dryland	1,147,000 hectares

Before the Revolution they had only 75,000 irrigated hectares. For centuries people here had been dreaming of irrigation. Before the first five-year plan they had around 70,000 hectares irrigated. Two hundred and fifty thousand were added during the first and second plans; another 600,000 between 1937 and 1952; some 87,000 between 1952 and 1957; and plans call for another 533,000 to be irrigated by 1965. Obviously all of this irrigation has had a drastic influence on farm life.

They have 1,400 collective farms and 133 state farms. Obviously the state farms are much larger and most are newly organized with the reclamation. Cotton growing dominates and this Republic produces two-thirds of the cotton of the USSR.

They give me the following figures for selected years:

Year	Hectares	Yield of seed cotton ^{a/} in tons per hectare
1913	423,000	1.22
1940	920,000	1.5
1956	1,304,000	2.1
1957	1,288,000	2.1

^{a/} Lint cotton would be about 35 to 40 percent of these figures.

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1957	1,288,000	2.1

a) Lint cotton would be about 35 to 40 percent of these figures.

Gradually they have given up cotton in nonirrigated areas because of low yields. Then too, they have expanded the growing of jute and kenaf to 20,000 hectares.

They have 916,000 hectares under various grains including 32,000 of paddy rice.

For stock they grow corn or sorgo, a kind of millet called "jugara," on 480,000 hectares. They also have some corn for grain.

Second after cotton comes silkworm breeding. In 1913 they produced 3,960 tons of cocoons; and in 1956, 14,631 tons.

Of third importance is karakul. They produce 1,500,000 skins annually, or two-thirds of the production of the Soviet Union.

The other livestock is summarized as follows:

Dairy cattle, 500,000. This includes those owned by individual families.

Goats, 400,000 on farms.

Donkeys, 50,000. They are trying to reduce these.

(Added later: They didn't like us to take pictures of them.

The Russians, not the Uzbeks, are ashamed of this symbol of poverty.)

Horses, 350,000 on farms.

Camels, 80,000 in the desert.

Poultry, no figures but they have chickens, geese, ducks, and turkeys.

They say that the Republic produces about one-half of its own food and livestock products.

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food and livestock products.

Although the winters are cold, climate and soil favor fruits and melons. I sample some of these melons and they are exceedingly fine. It is said that some of them weigh as much as 60 kilograms. Plans call for expanding these crops. In 1917 they had 18,000 hectares of orchard and 26,000 hectares of grapes; now the figures are 80,000 and 30,000 respectively. In 1954 a disastrous early frost killed many of their fruit trees.

Among the crops grown are winter wheat, spring wheat, barley, corn, oats, a little rye, grain sorghum, pulses, tobacco, seed flax, sesame, potatoes, alfalfa, fodder crops, pomegranates, figs, vegetables, and vegetable seeds.

I am told that all their great progress has been due to Soviet power, machinery, and the organization of collective farms. Before the Revolution they had essentially no machinery, only 1,000 metal plows, 337 harrows, and 12 seed drills. Then the main implement was the wooden plow of which there were 135,000.

Now the collective farms have 25,087 tractors and the state farms 11,000 with a total horsepower of 700,000. In addition they have 14,600 cotton pickers, 4,387 machines for picking unopened cotton bolls, 13,770 machines for removing cotton shrubs, and 8,345 machines for cleaning the cotton from unopened bolls. Then besides, they have in the machine and tractor stations trucks, cars, planes, seed drills, cultivators, graders, bulldozers, ditchdiggers, etc. Ninety-eight percent of the plowing is done by machines. Only small plots are done by horses. About 98 percent of the cotton is planted by machines

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Although the winters are cold, climate and soil favor fruits

and 97 percent of it cultivated by machines. Seventy-two percent of the grain is harvested by combines. Some of the land is too hilly for combines.

"Both yields and living standards are continually increasing," we are told. "Now we have agricultural specialists of our own. The main feature of the people here is brotherhood for all of the people in the country. They want peace for themselves and for all people in the world!"

We then agree on our schedule, which includes a visit to Andizhan, near the border of China in the Fergana Valley. I try to get some figures on fertilizers but I'm afraid the answers are not very clear to me:

Sulphate of ammonia, 1,000,000 tons. (The discussion brings out that this includes some ammonium nitrate and some hydrous ammonia, of which 20,000 tons is applied directly to the soil.)

Superphosphate (18.7%), 800,000 tons. Most of this is produced locally.

In the Vice-Minister's office is a beautiful map of the Republic showing the main irrigation projects. I try some kodachromes but I'm afraid it's too dark.

I take leave of the Vice-Minister and go for a short drive on the main street to take some pictures. I buy an Uzbek painting of Samarkand and an Uzbek cap.

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This bit of shopping is quite a job. As our group gets down from the bus, a huge crowd gathers. As many as possible crowd into the stores that I enter. I never selected a painting under less unrelaxed conditions. In the store where I buy the cap, the crowd gives a great cheer as I try it on. These Uzbeks are very simple, kindly people. I think the Russians are pushing them too fast.

We take a short drive through the old part of the city, which is much like southern Asia. We then are back to the hotel for a light lunch.

We then go to a scientific research institute on irrigation and water utilization. This comes under the Ministry of Agriculture for the USSR and carries out work in three republics in Middle Asia.

(Added later: I'm not entirely clear on the relationships among all these agencies. According to Mr. Bulik's notes, this institute is called, Middle Asia State Project Institute for Water Economy and Cotton. Local people use a special word derived from its initials SREDASGIPROVODKHLOPOK.)

We meet several on the staff:

1. Nadzhimov, Fakhri Nadzhimovich. Corresponding Member Uzbek Academy of Agricultural Sciences. Director of Institute.
2. Khusan-Khodzhaev, Zukur Khusainovich. Candidate of Technical Science. Vice Director for Science.
3. Kolodkevich, Dmitrii Pavlovich. Candidate of Technical Science. Director of Laboratory for Automatic and Telemechanics.
4. Dudkin, Anatolii Sergeevich. Candidate of Technical Science. Director of Melioration Section.

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5. Ivanenko, Valerii Lolyevich. Scientific Secretary of Institute.
6. Kaberle, Sergei Ivanovich. Candidate of Technical Science. Director of Hydrotechnical Laboratory.
7. Legostaev, Viktor Mikhailovich. Candidate of Technical Science. Director of Melioration Section of Scientific-Research Institute of Cotton.
8. Korzhavin, Boris Ivanovich. Professor. Vice Minister of Water Economy of the Uzbek SSR.

Mr. Nadzhimov tells us about their work.

They are trying to develop a balanced water system for all of their rivers taken as a whole. The two main ones are the Syr-Darya and the Amur Darya but there are many small tributaries. This scheme also is designed to control erosion and prevent wastes of water. Near Tashkent a new reservoir of 200,000,000 cubic meters will improve irrigation on 132,000 hectares and will permit irrigating 20,000 hectares of new land. This storage costs 4 to 7 rubles for each cubic meter.

He goes on to give us a great many statistics about the size of the many canals in the Fergana Valley and elsewhere.

They have a big scheme under way for irrigating the "Hungry Steppe." They plan to reclaim 610,000 hectares. Two-hundred-five thousand hectares are already reclaimed and irrigated. Three republics are involved in this scheme: 280,000 in the Uzbek Republic; 100,000 hectares in Kazakhstan; and 25,000 hectares in the Tadzhik Republic. It is said these are good soils lacking only water. He then goes on to give us figures on the earth to be moved, etc. including

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1,000,000 cubic meters of concrete, 200 kilometers of drainage and so on in the Uzbek Republic.

They begin with soil surveys and hydro-geological surveys to plan the reclamation. The soils are somewhat salty and must be leached. On cotton they use from 2,000 to 4,000 cubic meters of water besides that required for washing out the salts.

(Added later: After seeing the excessively wide spacing of the open-drainage ditches, I think they are washing the salts down rather than out and will have trouble with salts unless more drainage is installed.)

He says much of this area has a water table at 1.5 to 2.5 meters. This water has a salt content of 2 to 8 gr. per liter, or even higher. He says that in this soil water will rise 4 to 6 meters by capillarity. When the water table is at one meter cotton uses from 7 to 8 thousand cubic meters of water per hectare, and alfalfa 16,000. When it is 2 meters to the ground water they use 2 to 4 thousand cubic meters per hectare on cotton. When it is 3 meters the figure is 1,500 to 2,000. The more water that is used on the surface the less can be taken from the underground. (The salt content of the ground water will increase, I believe.)

Cotton is irrigated from April 20 to September. After harvest they remove the cotton plants and use them for fuel. (This might help the salt balance some, at least it is an important factor in preventing excess salts in the Gezira Scheme.) After the plants are removed,

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they plow, make bunds, and flood with about 2 to 6 thousand cubic meters per hectare, depending on the salinity. The layer of water is kept to about 20 to 30 centimeters on old land. They plow in the spring and plant cotton.

They say that the irrigation water from the canal contains about .5 grains of salt per liter.

The soils are said to be typical Sierozems. Under long irrigation these change into "meadow" soils, with swampy Solonchak and meadow-Solonchak in the low places.

The works are constructed by three big building trusts financed partly by the USSR, and partly by the Republic. For the Hungry Steppe all the money is said to come from the USSR.

All plans and designs are said to be checked by engineers and scientists of the Amelioration Institute of the Academy of Sciences of the Uzbek Republic.

They design to avoid severe silt problems as much as possible. The river water is quite silty. Their researches show that sprinklers require only one-half as much water as furrows.

Again we have fruit and some more of the wonderful melons.

We go out into the outdoor research area where they have many experimental models of design for both general and specific situations. (K-2575; K-2576) Much of this design work is to develop schemes for taking clear water out of muddy streams for irrigation and for electric power. (K-2577; K-2578) Then they have models of settling basins of various types from which the silt can be removed by machines. (Actually they need more extensive work than they have here for testing scale

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K-2575. August 7, 1958. Tashkent. Institute of Water Economy. Model of irrigation set-up to take out silt-laden water. Clear water at left.



K-2576. August 7, 1958. Tashkent. Experimental layout at Institute of Water Economy.

8-2575

8-7

K-2575. August 7, 1958. Treatment. Institute of Water Economy. Model of irrigation set-up to take out silt-laden water. Clear water at left.

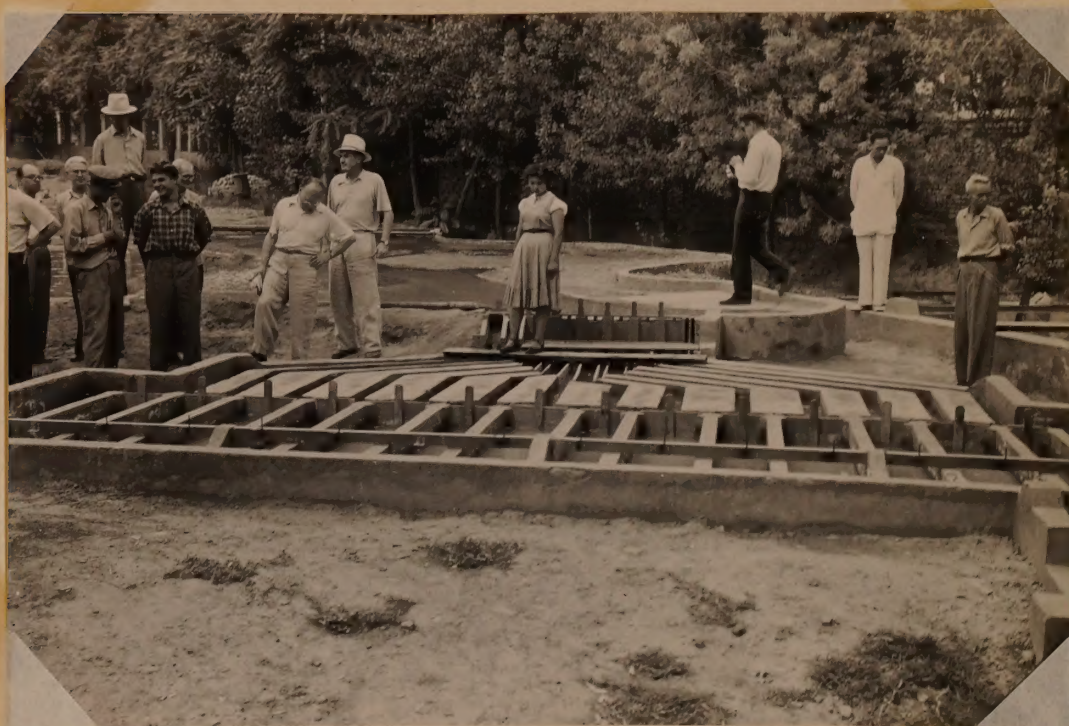
8-2576

8-7

K-2576. August 7, 1958. Treatment. Experimental layout at Institute of Water Economy.



K-2577. August 7, 1958. Tashkent. Design at Institute of Water Economy for taking out irrigation water without a dam. Machines continuously remove the "silt" from the canal heads.



K-2578. August 7, 1958. Tashkent. Model to study movement of "silt" for design of settling basin to remove it before the water enters turbines at hydro-electric installation. Institute of Water Economy.

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K-2577. August 7, 1958. Tashkent. Design at
Institute of Water Economy for taking
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Machines continuously remove the "slit"
from the canal heads.

K-2578

K-2578. August 7, 1958. Tashkent. Model to
study movement of "slit" for design
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models of actual systems.)

After much discussion and many pictures we return to the hotel at 6:30.

After dinner some of us are taken to an Uzbek outdoor theater. The play was based on the life of a famous Uzbek writer and philosopher, Alisher Navoi. This was recently written and pictures him as a great friend of the good but downtrodden people. It conforms to present Communist ideology. The acting is good and the costumes are interesting re-creations from the 14th century.

The director of the play translates from Uzbek to Russian to my interpreter, and he, in turn, gives me the English. Between acts we have to go into the director's office for completely unnecessary and unwanted refreshments. The play is interesting but too long or else I am too tired.

One of the drivers takes me back before it is over and I am in bed as one day changes to another.

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August 8

We have an early breakfast and leave the hotel in a bus at 8:10 for the Akhun Babaev Collective Farm in the Syr-Darya Rayon of the "Hungry Steppe."

As in the other cities of the Soviet Union, the Tashkent skyline has many scaffolds and cranes for new building.

We are soon in areas growing cotton in large fields. The villages are a mixture of characteristic South Asian mud houses with nearly flat roofs and high mud walls and of whitewashed small homes with metal or tile roofs from the Russian influence. These newer homes have more windows. Part of the new ones resemble farm houses in Ukrainia, even to blue picket fences. In the home plots I see a broomcorn-like millet, corn, fruit trees, grapes, melons, sunflowers, potatoes, and vegetables. There are many trees, especially poplars and willow-like high shrubs, and other unidentified shrubs, along the roads and canals.

We pass a winding natural ravine typical of Sierozem. I am told this soil contains 2 to 2½ percent humus in an A horizon around 20 to 25 centimeters thick.

Tashkent is on the third terrace and we pass over the second terrace of the Chirchik River. These terraces have loessial coverings. My guide says that the Sierozems here have no silica pans.

We pass Yangi Yul.

Along here I see some goats and fat-tailed sheep.

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We have an early breakfast and leave the hotel in a bus at 8:10 for the Akhun Babayev Collective Farm in the Gyr-Batya Rayon of the "Hungry Steppe."

As in the other cities of the Soviet Union, the Tashkent skyline has many scaffolds and cranes for new building. We are soon in areas growing cotton in large fields. The villages are a mixture of characteristic South Asian mud houses with nearly flat roofs and high mud walls and of whitewashed small houses with metal or tile roofs from the Russian influence. These newer houses have more windows. Part of the new ones resemble farm houses in Ukraine, even to blue picket fences. In the new plots I see a broomcorn-like millet, corn, fruit trees, grapes, melons, sunflowers, potatoes, and vegetables. There are many trees, especially poplars and willow-like high shrubs, and other unidentified shrubs, along the roads and canals.

We pass a winding natural ravine typical of Solorom. I am told this soil contains 1 to 2 1/2 percent humus in an A horizon around 20 to 25 centimeters thick.

Tashkent is on the third terrace and we pass over the second terrace of the Chirchik River. These terraces have loessial coverings. My guide says that the Solorom here have no silica pans.

We pass Yangi Yul.

Along here I see some goats and fat-tailed sheep.

The cut banks along the Chirchik River have vertical walls with cracks as in loess. It is difficult to tell, but I believe that much of this loess has been moved to its present position by the river. As we drive into the newer areas I see some going commercial orchards. Quite a bit of this old terrace has ravines and a mezzo-relief that makes leveling very difficult.

We drop down onto the first terrace and stop for a few minutes at the 55 kilometer stone. (K-2579) Our guides give us few opportunities to photograph the old villages. Apparently they are ashamed of them. Although we were told that all cultivation is by machines I see many women out in the fields taking out weeds with the old fashioned short-handled hoes.

We pass Chinaz. Here the Chirchik joins the Syr-Darya, which we cross. Now the Hungry Steppe begins. The new villages are distinctly Russian, with small cottages, some for two families. I guess that many of the people here are from the Ukraine.

We pass the Syr-Darya Rayon Center and at 11:32 arrive at the farm after a rough ride.

The chairman is an Uzbek named Assadula Ubaidulla-Khadzhaev. The interview takes double translation from Uzbek to Russian to English. The Akhun Babaev Collective Farm was founded in 1942-43. The total area is 3,000 hectares. (Added later: I must have misunderstood this figure. I think it refers only to the total agricultural land as of now.) They started with 200 hectares of

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K-2579. August 8, 1958. 55 km. west of Tashkent.
Irrigated cotton on first terrace.

K-2579

XI-3

K-2579. August 8, 1958. 55 km. west of Tashkent.
Irrigated cotton on first terrace.

reclaimed land, of which 125 were cotton and the rest were under food crops, including 25 hectares of rice. Now they have about 1,800 hectares with crops as follows, in hectares:

Cotton	1,200
Alfalfa	450
Orchards and vines	25
Grain sorghum	86
Silkworm nurseries	14

(By silkworm nurseries, he may mean an approximation of the land supporting mulberry trees.)

Vegetables	25
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There are 630 families and 1,050 workers, of which 600 work in cotton. (All mechanized?) The chairman says there are 700 workers and 350 women. Women with children do not work on the farm.

Last year they had 3.55 tons per hectare of seed cotton for which they received 350 rubles per centner.

Each family has .15 hectare of irrigated land.

The farm has 550 head of cattle including 200 milk cows, 1,700 sheep, and 150 horses. It is said they have no goats nor donkeys. The average milk per cow is 2,000 liters annually. Since they keep 350 tons of milk for their own use out of a total production of 400 tons, I assume that most farmers do not have private cows. As required, they delivered 30 tons (live weight) of meat to the government at 8.5 rubles per kilogram, averaging all beef and mutton.

reclaimed land, of which 125 were cotton and the rest were under food crops, including 35 hectares of rice. Now they have about 1,800 hectares with crops as follows, in hectares:

Cotton	1,200
Alfalfa	450
Orchards and vines	25
Corn sorghum	85
Silk worm nurseries	14

(By silk worm nurseries, he may mean an approximation of the

land supporting mulberry trees.)

Vegetables 25

There are 630 families and 1,050 workers, of which 600 work in cotton. (All mechanized?) The chairman says there are 700 workers and 350 women. Women with children do not work on the farm. Last year they had 3.25 tons per hectare of seed cotton for which they received 350 rubles per centner.

Each family has .15 hectare of irrigated land.

The farm has 250 head of cattle including 200 milk cows, 1,700 sheep, and 150 horses. It is said they have no goats nor donkeys. The average milk per cow is 2,000 liters annually. Since they keep 350 tons of milk for their own use out of a total production of 400 tons, I assume that most farmers do not have private cows. As reported, they delivered 50 tons (live weight) of meat to the government at 8.5 rubles per kilogram, averaging all beef and mutton.

Fertilizers on cotton are said to include 250 kilograms of ammonium sulphate, 350 kilograms of superphosphate, and 6 to 10 tons of farm manure per hectare. He says they put the fertilizer in rows but it is not clear to me whether these are drill rows or cotton rows. The cotton is irrigated four times. The first is on the 16th of May with 1,000 cubic meters of water; the second is the 10th to the 20th of June with about 1,500 cubic meters; the third is the 15th to the 30th of July with 1,500 meters; and the 4th irrigation is just now being started. The total water varies from 4 to 6 thousand cubic meters per hectare.

At blossoming time they apply part of the fertilizer as a side dressing before irrigation.

The soils are said to be mainly light Sierozems originally. Near the river they now speak of Meadow-Sierozems as a result of irrigation and cropping. Some of these Meadow soils with water tables at one to two meters are nearly black. On the slightly higher land the water table is at 2 to 3 meters. The soils have some salinity.

We are told that before irrigation the water table was at about 2 meters. The chairman says that the present water table now is a bit lower just before irrigation as a result of their drainage system. He says that the soils are less salty now than at the start. When irrigation first started, the water table rose and brought up salts; but the drainage system pulled it back down.

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The chairman says that the families represent 14 nationalities from various parts of the USSR. These include 80 families from the Tashkent Oblast. Some Ukrainians came before the Revolution. (I suspect more came during the Revolution than they report.)

The government of the USSR pays for the reclamation and canals. Farms pay nothing for the water and do not expect to have to. The canals that supply water to several farms are maintained by the government of the Uzbek Republic, while the Ministry of Agriculture of the USSR maintains those systems that serve the three republics. But small canals and drainage systems within farms are maintained by the farms themselves and are part of the farm inventory.

Rice growing is permitted only on soils first reclaimed or in wet places but not on the good soils of the Hungry Steppe.

The chairman says that laborers not working on cotton help reclaim new land. This year they reclaimed 400 hectares and the plan calls for a total of 3,000. (This is the total area so I suppose that some of the crops already listed are not irrigated, or else part of this is on land outside the farm.) He says the cotton laborers rest in December, January, and February except for small repair jobs.

The chairman says that the average number of labor-days for all the workers on the farm was 300 and he says that each one was worth 26.1 rubles plus 2.5 kilograms of wheat. (The farm must buy this.) This sounds quite good to me, if true. The chairman says that 85 percent of their cotton was of extra quality. The staple length is

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35 to 36 millimeters. The gross income was 16,875,000 rubles.

They deliver the raw cotton to the government and get seeds for planting from the government. They plant 150 kilograms per hectare in check rows 50 x 50 centimeters. Insects are controlled by spraying from planes. They claim to use a systemic spray that lasts 50 days and gives good control of web worms. I fail to understand the name of this material. Two hundred grams of it are dissolved in 100 liters of water.

The cropping system is said to be four years of cotton and three of alfalfa.

The farm now has its own machinery with main items as follows:

- 1 Diesel electric power station
- 40 Tractors
- 15 Trucks
- 12 Cotton seeders
- 1 Silage harvester
- 3 Cars

And of course the other machines to go with them.

We go out to look at the fields. (K-2580) The first one is now being cultivated during its second year. The virgin soil is a saline Sierozem with platy structure in the surface and small accretions of salt, mostly calcium sulphate and sodium chloride. The silt loam surface soil has a pH of 8.0 to 8.7. It is said that Solonetz is relatively uncommon in the Hungry Steppe.

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K-2580. August 8, 1958. West of Tashkent. On Akhun Babaev Collective Farm. First-year cotton after reclamation at left; third-year cotton, right.



K-2581. August 8, 1958. West of Tashkent. Drainage canal on Akhun Babaev Collective Farm.

K-2580

X-IX

K-2580. August 8, 1958. West of Tashkent. On Akhram Babayev Collective Farm. Three-year cotton after reclamation at left; three-year cotton, right.

K-2581

X-IX

K-2581. August 8, 1958. West of Tashkent. Drainage canal on Akhram Babayev Collective Farm.

I look hurriedly at the soil in a pit. It does not appear to me to be a fully developed Sierozem but rather an Alluvial-saline-Sierozem intergrade or Regosol-Sierozem intergrade. But my guides insist that this material was laid down at least 4,000 years ago. Dr. Allaway checks the pH of the irrigated soil at between 7 and 8 and of the irrigation water at 9.

I photograph a drainage canal. (K-2581) These are spaced at 1,000 meters and seem altogether too far apart to me. I fear they may be simply driving the salts down rather than taking them out. Mr. Melnikov agrees that supplemental drainage may be necessary. I think tile would be best.

We stop in a village (K-2582) and the chairman takes us to lunch. This is said to be a typical Uzbek menu which is nearly the reverse of our menus. It starts with champagne, followed by bread and fruit, including nectarines, melons, grapes, watermelons, and apples. Then in order comes soup, green tea from little bowls, and finally mutton and rice.

We talk a bit more about the reclamation program. First the irrigation and drainage canals are put in. Secondly the land is levelled. Thirdly the fields are flooded with 6,000 to 15,000 cubic meters per hectare. This is done twice in the autumn and once or twice in the spring. The cotton stalks are removed and used for fuel. Now they have a new factory in this area for making alcohol out of them.



K-2582. August 8, 1958. West of Tashkent. New house
on Akhun Babaev Collective Farm.

K-2582

6-11-68

K-2582. August 8, 1968. West of Tashkent. New house
on Akhun Babayev Collective Farm.



K-2583. August 8, 1958. West of Tashkent. Two travelers.



K-2584. August 8, 1958. West of Tashkent. Village, not yet rebuilt by Russians.

2583

7-11

K-2583. August 8, 1958. West of Tashkent. Two travelers.

2584

8-11

K-2584. August 8, 1958. West of Tashkent. Village, not yet rebuilt by Russians.

We leave the farm at 2:50 p.m. Just as I leave I am presented a beautiful bouquet. In this heat it will be hay by the time I get to the hotel. The combination of heat, dust, rough roads, and this bumpy bus gives my back a real workout. (K-2583; K-2584)

On the way back to Tashkent we stop briefly (I hope) at the Middle-Asian Scientific Research Institute of Mechanization and Electrification of Irrigated Agriculture. We are met by the Director of the Institute, Mr. Irgashev.

In their work they stress cotton growing. This Institute was founded in 1954 on the basis of an experimental station of the Cotton-Growing Institute of the USSR. The present Institute is wholly or partly (I am not clear) under the Academy of Sciences of the Uzbek Republic. The scientific work is organized in 11 laboratories according to field operations, each headed by a masters candidate of engineering.

They develop machines to carry out proved methods of crop management. All newly designed machines are tested here. If satisfactory, they are recommended for state and collective farms. The Institute also gives courses in machinery for farm people and issues propaganda pamphlets for introducing the new machines on farms.

We are taken out into the yards and shown some of their exhibits:

1. First of all I see a machine for mixing and granulating manure and mineral fertilizer. It is very small and strikes me as being very silly.

We leave the farm at 2:30 p.m. and as I have I am presented

a beautiful landscape. In this farm it is very nice and

very small. The small number of people that work there and

the way they work is very interesting. (1-23) 2-1954

On the way back to the farm we stop briefly at some other

places. In this farm we saw a lot of things of interest and

the way they work is very interesting. It is very nice and

very small. The small number of people that work there and

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and then recommended for state and collective farms. The Institute also

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concerning the new machine construction.

We are taken out into the yards and shown some of their exhibits

in the first of all I saw a machine for sowing and gathering

grain and mineral fertilizer. It is very small and simple in

construction.

2. A manure spreader (Added later: Although there are probably others it turned out that this was the only one that I saw in the Soviet Union.)

3. Broadcast drill for mineral fertilizers.

4. Gang plows

5. Harrows

6. A cotton planter with a fertilizer distribution system that does not seem to be very good.

7. Cotton planter

8. Machine for applying liquid ammonia

9. Cotton pickers

10. Machine for picking unripe cotton bolls

Of course I am no expert on agricultural machinery but many of these seem awkward and clumsy to me.

We leave at 6:00 p.m.

On the way back to the hotel, near the edge of the city, our bus sideswipes a small truck, which in turn, knocks down a horse. We persuade the driver to stop; but he is concerned only with some slight damage to the bus. He soon drives on again without going back to the scene of the accident. Different countries have different rules!

But I am very glad that we do drive on. I have an uneasy stomach, perhaps from too much melon yesterday, to say nothing of being extremely tired from this long bumpy ride, the heat, and the dust. We finally bump along to the hotel at 7:15. Never have I more enjoyed a bath and a hair wash than tonight. We have a leisurely dinner.

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Something was a bit wrong on this farm today. We saw very few of the people or their villages. The conversation went from Uzbek to Russian to English; yet I feel sure this old Uzbek chairman understood Russian and that I heard him speaking Russian. Then too, I feel that he got a lot of prompting from the officials. One never knows.

Nor do I believe that they can remove the salts from the soils properly with open drains at 900 to 1,000 meters. Certainly these should be supplemented, preferably with tile. And I have no doubt that when, as, and if the yields decline they will do so. Yet the cotton looked quite good, except near the margins of the fields and in a few spots with poor stands.

I wish I could be free here for a couple of weeks with a car and a driver. If this place was like what I think it was some 50 years ago, the Russians have made great improvements. Tashkent is not so good as Kiev and Moscow, but a very large cut indeed above India, Pakistan, and the Near East, despite the running water in the gutters that people use for nearly all purposes. Yet I feel that the Russians are too impatient and are pushing these people too fast. Of course, I do not expect any political uprising but there could be a moral breakdown.

To bed at a decent hour.

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To bed at a decent hour.

August 9

After a good rest last night I believe that I am back to normal. I take a short walk in the cool of the early morning. This promises to be another very hot day.

We are through breakfast and in the bus at 9:00 a.m. and have to wait awhile for our driver. For some reason Melnikov stays in. We stop at the bank to change money and then drive east to the edge of the city. To the right is the valley of the Chirchik River and beyond I see the high mountains to the south. On the margin of the valley is loess. The normal soil here is Sierozem. In the alluvial valley there are meadow and marshy soils in places but few if any salty soils. It is said here that the Alluvial soils have been irrigated for 150 to 200 years, and a few for 800 years. The irrigation has brought about great changes of the soils toward Chestnut or even Chernozem.

We drive by a collective farm that is mainly cotton, with some orchards and vineyards, especially in the private plots. The farm houses are partly in the old Uzbek style with few windows and partly in the new Russian style. These are better than the strictly city suburbs. We turn north from the main road. It is bordered mostly with mud walls on either side with many trees of various sorts, including acacia, poplar, apple, plum, and pear. We cross the canal for irrigation and power that goes through the city of Tashkent. I see some kind of pulse and meadow but most of the land is in cotton.

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At 10:25 we come to the Akkavak Central Agro-Technical Experimental Station, said to be under the Scientific Research Cotton-Breeding Institute, which is in turn, under the Uzbek Academy of Agricultural Sciences and, as I understand, this is under the Lenin Academy of Agricultural Sciences in Moscow. (This complicated hierarchy may not be correct.)

We first meet in the office of Director Madraimov. He tells us that this station was founded in 1923. The central problem is to develop new agro-technical methods for growing cotton and the other crops associated with cotton, including perennials. They have the following laboratories:^{a/}

1. Soil management, including work on seed beds, etc.
2. Irrigation
3. Agro-chemical
4. Plant physiology
5. Crop rotations

They have 10 postgraduate students besides students of the Agricultural Institute here in Tashkent. The Vice-Director of the station has large-scale experiments on cotton physiology.

^{a/} As translated into English this word is used more broadly in the Soviet Union and in other countries than in the United States. Commonly it includes field trials, greenhouses, and other outside work. For example, a geographic laboratory is not much besides a library and a place to study.

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Mr. Popov describes the soils of Middle Asia, which are mainly Sierozems. Professor Glinka studied soils here about 50 years ago. The Middle Asian University was started in 1920. As a part of this University a Pedological Institute was organized by Professor Dima. (He is now 86 years old and lives in Moldavia.) Now they have well organized soil surveys of the Uzbek Republic. He shows us a soil map of the Republic made in 1932 at a scale of 1:420,000 that has 48 items in the legend.

A great variation in soils is due to mountains of 3,500 meters and deserts of only 50 meters above sea level. The station itself is concerned with the soils of the river valleys and deserts. They have made or are making soil maps of all areas suitable for cotton at scales of 1:25,000 or 1:50,000. Each state and collective farm has or will have a soil map at a scale of 1:10,000. They also prepare generalized soil maps of each oblast and each rayon. Most of this soil mapping was completed by 1938.

I suggest that I should very much like to have copies of these as examples. (Added later: They do make me a copy of an example of a general map at 1:50,000, but not of the detailed maps.) He shows me one of the area served by one of the machine and tractor stations at 1:50,000. They also make agro-technical maps by interpretation from the soil map. He shows me one of the Tashkent Oblast at 1:50,000 that has 25 different kinds of soil in the legend, together with recommendations for fertilizers and other practices. The detailed units in the soil classification are grouped somewhat for making

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recommendations to state and collective farms. He has a soil map of this station at 1:5,000.

Then he shows me a series of maps for a collective farm. The basic soil map has 7 mapping units. Then a supplemental map shows available phosphorus in three units. These maps do not look nearly so good to me as the ones at Minsk. But these are mostly pre-war and those at Minsk mostly post-war. These detailed maps appear to omit places not suitable to irrigation and also areas with buildings. It is clear, too, that there is little or no cooperation between the soil scientists and the civil engineers making roads and other structures; but he insists that all the reclamation engineers can read soil maps. The soil maps have legends that show the principal features of the named soil units. Derived maps are also made to show the depth of the "humus" layer.

We go to the plant physiology laboratory where they are trying to get varieties in which the bolls will open as early as possible. Although the summers are warm to hot, the season is a bit short.

(Rank in this Institute, as well as in the others we have visited, seems to be indicated by the massiveness and splendor of the desk set and lamp. This man has a very nice electric lamp and it seems to serve its primary purpose even though there seems to be no way to plug it into a socket!)

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The late cotton bolls are picked and placed in a warm oven at 35°C. Later they open and useful fiber is obtained. The treatment is said to increase the amount of fiber in a 17-day old boll by 60 percent.

They also study the effect of water and fertilizer on the quality of cotton fiber. They are trying to understand the environmental conditions that favor the formation of flowers, buds, and bolls.

We glance in the agro-chemical laboratory where they make analyses of soils and plants. The standard methods are published by this Institute but another laboratory in Tashkent makes the analyses for the interpretation of soil maps.

Out in the courtyard we are shown many pots, cased to control temperature, in which cotton is grown under different conditions of moisture and nutrition. (K-2585) We see a little muslin house in which a Chinese graduate student has rigged up an artificial rainmaker in order to study cotton growth under very humid conditions like those in parts of his country. He finds that the crop does well if fairly widely spaced. (K-2586)

These plants in the pots out in the sun are fertilized with all of the nutrients. They tried washing out the nitrogen when the first flowers form and found that the plants grew from nitrogen translocated within the plant.

Here they have experiments where they pick off the unripe bolls for heating and get good results with fair yields from those 17 days old.

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mental conditions that favor the formation of flowers, buds, and bolls.

We glance in the agro-chemical laboratory where they make analyses

of soils and plants. The standard methods are published by this

Institute but another laboratory in Tashkent makes the analyses for

the interpretation of soil maps.

Out in the courtyard we are shown many pots, cased to control

temperature, in which cotton is grown under different conditions of

moisture and nutrition. (K-2585) We see a little muslim house in

which a Chinese graduate student has rigged up an artificial rainmaker

in order to study cotton growth under very humid conditions like those

in parts of his country. He finds that the crop does well if fairly

widely spaced. (K-2586)

These plants in the pots out in the sun are fertilized with

all of the nutrients. They tried washing out the nitrogen when

the first flowers form and found that the plants grew from nitrogen

translocated within the plant.

Here they have experiments where they pick off the unripe bolls

for heating and get good results with fair yields from those 17 days old.



K-2585. August 9, 1958. Tashkent. Akkavak Central Agro-Technical Station layout of pots to study effects of fertilizer and other treatments.



K-2586. August 9, 1958. Tashkent. Akkavak Central Agro-Technical Station. Studying cotton plants under rain. If plants are not too leafy rain does not harm them.

IX-1

K-2585. August 9, 1956. Tashkent. Arkavsk Central
Agro-Technical Station layout of pots to
study effects of fertilizer and other treat-
ments.

9852-2

IX-2

K-2585. August 9, 1956. Tashkent. Arkavsk Central
Agro-Technical Station. Studying cotton plants
under rain. If plants are not too leafy rain
does not harm them.

I see a group of plants pruned to a single boll that are said to be growing with different amounts of water - 40 percent, 70 percent, 90 percent, and 100 percent of field capacity. The surface of the pots is covered with cotton to prevent evaporation. With the pruning the plants have uniform temperature. Under this situation the more nitrogen applied, the more rapidly the boll ripens. Thus in practice, when nitrogen seems to slow down ripening the effect is indirect through causing a large plant that reduces light and temperature and increases humidity.

In another series of pots they are studying root nutrition with nitrogen so that they may know the effect of nitrogen at all stages of growth and figure out the best time for application. Here they have selected four stages: (1) When leaves first appear, (2) when two full leaves appear, (3) when four leaves appear, and (4) at the start of flowering. Their experiments show that cotton requires high amounts of nitrogen from the start to the formation of buds, at least higher than they had formerly thought. Low nitrogen lengthens the growth period; and nitrogen application hastens flowering. They recommend to farmers that they apply nitrogen 3 times: (1) immediately after planting, (2) at budding, and (3) at flowering time.

They suggest that one-half of the phosphorus be applied at planting time and one-fourth of it at each of the other two stages.

They show us a set-up for studying the effects of fertilizers and nutrient balance on transpiration. Phosphorus-deficient soils have a high coefficient. They measure the transpiration by taking

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the weights of the plants and the dry matter. They apply measured amounts of water to the pots. The soil in the pots is mostly covered with paper or cotton. This experimental technique is unconvincing and is dated a bit before Briggs and Shantz.

It is very hot here in the sun.

We go out to the fields where there is experimental irrigation of cotton with furrows between alternate rows. Formerly the rows were 70 centimeters apart but now they prefer 50 or 60. If they irrigate with a furrow between every row at 50 centimeters spacing, about 60 percent of the field has compact soil. With furrows between alternate rows less cultivation is required. Yields are about the same but labor is reduced.

I look at an ordinary Sierozem in a very gently sloping field of irrigated alfalfa at this Akkavak Central Agro-technical Station.

A _p	0 - 11½"	Dark grayish-brown (10YR 4/2, moist; 10YR 6/2, dry) silt loam. Digs out in irregular small and coarse clods. These are friable with some difficulty.
B ₁ or A ₃₁	11½ - 19"	Brown (10YR 4/3) heavy silt loam. Moderate prismatic structure that falls irregularly into hard angular and subangular blocky. The peds are now hard and difficult to crush.
B ₂ or A ₃₂	19 - 33"	Lighter brown (10YR 5/3) heavy silt loam (dry 7/3) with some light gray mottling. Angular and subangular medium blocky. The soil is hard but more easily crushed than that in B ₁ .
B _{3ca} or C _{ca}	33 - 37"	Like above but with some concretions of calcium carbonate.

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B ₁ or A ₂₁	11" - 19"	Brown (10YR 4/3) heavy silty loam. Moderate prismatic structure that falls irregularly into hard angular and subangular blocks. The beds are now hard and difficult to crush.
B ₂ or A ₂₂	19 - 33"	Lighter brown (10YR 5/3) heavy silty loam (dry 7/3) with some light gray mottling. Angular and subangular medium blocky. The soil is hard but more easily crushed than that in B ₁ .
B ₃ or C _{ca}	33 - 37"	Like above but with some concretions of calcium carbonate.

C 37 - 57"+ Brown (10YR 5/3, moist; 10YR 7/3, dry) heavy silt loam. Some white nodules; weakly coarse prismatic; digs out as moderate subangular blocky. These peds are fairly firm to hard.

This soil is calcareous throughout. Probably the landscape is an ancient terrace with a surface of alluvium from loess or loess itself. (K-2587)

I go further down the slope in the blistering sun and look at another pit. The soil is about the same except for a somewhat stronger B and more clear "eyes" of calcium carbonate in the C.

Then I go still further down this gentle slope and into a third pit. I am told that the surface soil has had considerable addition through erosion from above, but I cannot see this, although there are somewhat less carbonates.

A _p	0 - 11"	Brown (10YR 4/2, moist; 6/2, dry) cloddy silt loam.
A-B	11 - 15"	Transitional
B	15 - 46"	Brown (10YR 4/3) silty clay loam. Moderate, medium prismatic that falls into hard medium angular blocky. (Dry, uncrushed peds are pinkish-gray (10YR 6/3)).
C	46 - 60"+	Brown (10YR 4/3) silt loam. Massive, but digs out in easily friable pieces.

This profile is calcareous throughout but lacks prominent "eyes." Probably all these soils are from loess, but it may have been reworked a bit with water. The better crops on the last two profiles are related, I believe, to moisture rather than to erosion as my local

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A_p 9 - 11" Brown (10YR 6/3, moist; 6/3, dry) silty
silt loam.

A-B 11 - 15" Transitional

B 15 - 46" Brown (10YR 4/3) silty clay loam.
Moderate, medium prismatic that falls
into hard medium angular blocky. (Dry,
unwashed beds are pinkish-gray (10YR 6/3)).

C 46 - 60" Brown (10YR 4/3) silty loam. Massive, but
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K-2587. August 9, 1958. Tashkent. Akkavak Central Agro-Technical Station. Sierozem soil (described). Dr. Cline in pit.



K-2588. August 9, 1958. Tashkent. Akkavak Central Agro-Technical Station. "Classical" cotton plots. Looking from no fertilizer plot to one at left with mineral fertilizer.

K-2587

W-III

K-2587. August 9, 1958. Tashkent. Akhmetov Central Agro-Technical Station. Sterile soil (described). In. Cline in pit.

9852-M

X-III

K-2588. August 9, 1958. Tashkent. Akhmetov Central Agro-Technical Station. "Classical" cotton plots. Looking from no fertilizer plot to one at left with mineral fertilizer.

guides suggest. Laboratory data show increasing clay in the position of the B horizon as one goes down the slope. But no very good conclusions can be drawn since the area had some smoothing by machines before plowing and preparation for irrigation.

These three soil pits are like ovens today. Dr. Cline works very hard with me; Dr. Allaway takes a quick look; but the others remain in the shade!

After Dr. Cline and I finish with the pits, the group assembles again to look at some old experiments on soil fertility with cotton laid out in the classical manner:

1. 30 tons of manure per hectare
28.4 centners of seed cotton
2. Cotton seed cake at 2.5 tons per hectare
29.3 centners of seed cotton
3. No fertilizer or manure
15.3 centners of seed cotton
4. Mineral fertilizer, including 150 kg. of N, 100 kg. P_2O_5
and 50 kg. of K_2O every year.
31.6² centners of seed cotton

These experiments are of doubtful accuracy. (K-2588) They are without proper replications and randomization. Experimental error must be high,

My guide tells me that the carbon-nitrogen ratios run from 7.0 to 9.9.

At 2:00 p.m. we go to the usual lunch with toasts and all the rest.

Golden rule: Laboratory work should show interesting results.

position of the 11 months in the field. The 11 months in the field.

very good conditions can be found since the area has been

conducted by means of a few simple and practical methods.

Results.

These large soil plots are like others. Dr. Cline says

very much with me. Dr. Cline says a quick look at the others

results in the field.

After Dr. Cline and I finished with the plot, the group assembled

again to look at some old experiments on soil fertility with cotton

field out in the classical manner:

1. 10 tons of manure per hectare
25.4 centners of seed cotton

2. Cotton seed cake at 2.5 tons per hectare
22.3 centners of seed cotton

3. No fertilizer or manure
15.3 centners of seed cotton

4. Mineral fertilizer, including 100 kg. of N, 100 kg. of P, and 50 kg. of K₂O every year.
21.6 centners of seed cotton

These experiments are of doubtful accuracy (4-5%) but are

without proper replication and randomization. As pointed out, they are

not so high.

Dr. Cline said the 11 months in the field and the 11 months in the field.

11 to 12.

At 1100 g. the 11 months in the field and the 11 months in the field.

1951.

At 3:30 we leave in the bus for another station (K-2589; K-2590), which we reach at 4:25. This is the Middle Asian Scientific Research Institute on Plant Breeding of the USSR. We are met by Director Vysotski.

He brings us into his office where we sit around a table loaded with fruits. The station is 30 years old. It has several laboratories for studying the various crops of Middle Asia and in other parts of Asia having similar climatic conditions. He says their primary task is to collect as many varieties as possible and then test them for usefulness, including also disease resistance. They now have 53,000 varieties of different crops under study.

(Apparently the staff here is a bit irritated and disappointed that the United States Crops Mission, although in Tashkent, did not visit them as these people had expected. It was a great pity. I suppose this is one of the biggest collections in the world and we are soil scientists with less than two hours!)

He tells us some of the groups of plants briefly:

1. Industrial crops, especially cotton, but also kenaf and jute and such oil-bearing crops as peanuts, sesame, sunflowers, and seed flax. They study also tau-saghyz for rubber. They have 4,800 varieties of cotton.

2. Field crops, including wheat, rye, oats, millet, barley, corn (550 varieties), grain sorghums, legumes, pulses, peas, soybeans, and others.

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seed flax. They study also cau-segnyx for rubber. They have 4,800

varieties of cotton.

2. Field crops, including wheat, rye, oats, millet, barley,

corn (250 varieties), grain sorghums, legumes, pulses, peas, soybeans,

and others.



K-2589. August 9, 1958. East of Tashkent. A partially excavated old "watching hill."



K-2590. August 9, 1958. East of Tashkent. Looking from cotton field toward the mountains.

5-11X

K-2589. August 9, 1958. East of Tashkent. A partially excavated old "watching hill."

K-2590

6-11X

K-2590. August 9, 1958. East of Tashkent. Looking from cotton field toward the mountains.

3. Melons, potatoes, and vegetables. Tomatoes have the first place here followed by eggplant, carrots, and cabbage. They try many others. They have over 1,000 varieties of potatoes and are trying to develop a scheme for getting two crops in one year. They have many watermelons, squash, pumpkins, and melons. Some varieties of melons can be stored all winter. (A few crops drop out from language difficulties.)

4. Fruits, including small fruits and grapes. They have a "luffa": it looks like a gourd and is used as a bath sponge.

A second objective of the station is to furnish varieties for the selection programs of other stations in the USSR.

They have found many new and previously undescribed varieties of fruits, vegetables, and grains in these Middle Asian Mountains. They have been able to grow a perennial wheat - a cross between wheat and couch grass. In practice, however, this is not a perennial. It gives a good crop the first year but not after that. It does not do well here.

We then take a quick walk around parts of the station. We pass through a huge vineyard with hundreds and hundreds of both wine and table varieties. The plants are very well cared for. (K-2591)

Then we go to see the melons under irrigation. (K-2592) The furrows are somewhat over 2 meters apart and there are literally hundreds of square test plots that are very well tended. (K-2593) We try a few of the melons but I'm a bit cagey after having had too many the other day.

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K-2591. August 9, 1958. Near Tashkent. Middle-Asian Scientific Research Institute on Plant Breeding of the USSR. Grapes.



K-2592. August 9, 1958. Near Tashkent. A group of women at the Institute.

2591

2-111X

K-2591. August 9, 1958. Near Tashkent. Middle-Asian Scientific Research Institute on Plant Breeding of the USSR. Grapes.

2592-K

8-111X

K-2592. August 9, 1958. Near Tashkent. A group of women at the Institute.



K-2593. August 9, 1958. Near Tashkent. Middle-Asian Research Institute on Plant Breeding of the USSR. Varieties of melons. Tall corn in background.

K-2593

XIII

K-2593. August 9, 1958. Near Tashkent. Middle-Asian Research
Institute on Plant Breeding of the USSR. Varieties of
melons. Tell corn in background.

We take just a quick look at some of the nicest corn I've seen in the USSR. One could spend many days here. I've never seen so many well-cared-for plants in one experiment station. This work must be very valuable indeed to this part of the Soviet Union.

We leave for Tashkent in the same bumpy bus and are back at the hotel at 7:15 and have dinner at 8:00.

This has not been a very productive day. Everything was done in too big a hurry. Little was completely explained or understood. The experiments at Akkavak do not have proper controls for modern statistical analysis.

After a small dinner that takes a long time I walk around the square and prepare for bed.

August 10

At 6:30 this morning it is a bit cloudy. I had been hoping very much for a clear day to fly over the mountains to Andizhan in the Fergana Valley. I have a bit of trouble to get boiling water (equals "kipitok," about the most important word in the Russian language.) But persistence finally won out and I have my tea.

I pack nearly everything, have breakfast, and take a walk in the town. (K-2595; K-2596) I am back in the hotel with just time for a haircut. Then to the airport.

We reach the airport at 11:00 a.m. and the wheels are up for Andizhan at 11:52. Unhappily it is hazy and a bit cloudy. The air is warm and dusty but not quite hot. As we leave Tashkent I note the low level of water in the wide braided bed of this Chirchik River. We fly over green fields toward the mountains. Within 5 minutes we are over dry billowy land with strong mezzo-relief that is used for cereals and rough pasture. Some places seem to be nearly barren. Irregular strips along the water courses are green from irrigation. A few of the dry stubble fields have been burned. By 10 minutes out most of the land is too rough from dissection for crops; and in 3 more minutes we are over strongly dissected and rugged hills. To the northeast I see higher peaks with a bit of snow. Then we pass over a small valley with a stream, a road, a railway, and some cereal fields. The stream is well braided. The fields and villages are on an old first terrace that had been well braided. The little Valley is very

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K-2595. August 10, 1958. Tashkent. A courtyard as it looks from the street with the door open.



K-2596. August 10, 1958. Tashkent. An ordinary street in a good residential section.

III-3

K-2595. August 10, 1958. Tashkent. A courtyard as it looks from the street with the door open.

K-2596

III-4

K-2596. August 10, 1958. Tashkent. An ordinary street in a good residential section.

narrow up to one-half mile wide where we cross it. Its tributaries have a few green spots along them in the well-dissected foot hills. Even in these I see a few steeply sloping grain fields in favored places.

We pass over the mountains. Most of the soil is reddish-brown with a cover of scattered shrubs or trees that resemble junipers. At 23 minutes out the mountains are strongly dissected and have sharp rocky peaks. Again to the northeast I see another green valley with crops, trees, and villages. It bends to the south and we cross it. We pass over jagged, gray and pinkish-brown low mountains that appear to be barren except for a few tiny favored places. I see a poor road but no animals or people. A few minutes later we cross another drainage-way that has no green along it.

At 30 minutes from Tashkent we come to the edge of the Fergana Valley and cross the Syr-Darya River, here a winding, mature stream with some braiding. This valley is about 150 kilometers wide and 300 kilometers long. The pattern from the ground varies from nearly regular irrigated fields to highly mottled ones. Some parts are nearly barren, probably partly from salt and partly from irregular relief. Certainly some of the fields are too salty for crops. Out further in the valley the villages are quite numerous.

Then at 38 minutes out I see to the northeast a large nearly barren plain that appears to be salty. One of our hosts says that it is Solonchak.

1000

We soon reach the Yazyavanski Steppe, which is said to be the main part of the Fergana Valley. The soils are salty and seem probably to be in an old playa called the Fergana Depression. Apparently flood water and drainage water have been allowed to evaporate here.

At 45 minutes out the soils are less salty, yellowish-gray, nearly barren, and with mild relief. Then we come over green fields, mottled with Solonchak. As we go on the villages increase except for another area with this same mottling with Solonchak.

At 12:43 p.m. I can look far to the northeast at green fields and many villages. The Solonchak has decreased. We pass just south of Namangan and the wheels are down at Andizhan at 12:50. The town is said to be 470 to 500 meters above sea level. The rainfall is about 300 millimeters. It is now hot, dusty, and hazy.

We go at once with our hosts in the cars. There is cotton on either side of the road. Mulberry trees line parts of the road and are along many field boundaries. I see weedy tomatoes, alfalfa for seed, tobacco, grain sorghum, corn, hay, fallow, and a very tall grain sorghum.

As we enter the city I see one-story houses of local brick. The walls are much like those of southern Asia but the houses are neater and have more windows. As we get to the center of the city I see more Russian influence. Many of the houses and other buildings are pastel blues and greens.

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We leave our baggage in the hotel and go to a banquet-luncheon given by our local hosts including the chief of the agricultural administration of the Andizhan Oblast, Mr. Abdurakhemov. This is more lunch than I want and there are a very great many more flies than I like. I am told that the Oblast produced last year 450,000 tons of seed cotton. This year they expect 475,000 tons with yields of 3 tons to the hectare.

I ask to go to the bazaars. We walk down the nicest street, Lenin Street, and it is perfectly obvious that I am purposely being led to the stores that sell goods from Russia. I ask again about the bazaars but my interpreter asks me not to press it. My guides are ashamed of the local bazaars that sell the Uzbek handicrafts. 'Tis a pity.

We get in the cars at 4:00 p.m. for a visit along the canal. It is said that soils have been irrigated here for 2,000 years but the present main canal was made in the 1930's. Cotton is the main crop but they have also rice, and corn and alfalfa are commonly grown in the rotation with cotton.

I am told that Andizhan started about 700 years ago. The old part of the town is characteristically Near East and my guides drive through that part as fast as they can. They are ridiculously self-conscious. Yet the local people are still building the old-style houses and walls. They start with oblong balls of mud about the size of a brick. They lay these on top of one another and put on a mud facing. Many are whitewashed; some have pastel pink, green, and

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given by our local hosts including the chief of the agricultural administration of the Andizhan Oblast, Mr. Abdurakhmanov. This is more lunch than I want and there are a very great many more flies than I like. I am told that the Oblast produced last year 450,000 tons of seed cotton. This year they expect 475,000 tons with yields of 3 tons to the hectare.

I ask to go to the bazaar. We walk down the nearest street, Lenin Street, and it is perfectly obvious that I am purposely being led to the stores that sell goods from Russia. I ask again about the bazaar but my interpreter asks me not to press it. My guides are ashamed of the local bazaar that sell the Uzbek handicrafts. 'It's a pity.'

We get in the cars at 4:00 p.m. for a visit along the canal. It is said that wells have been irrigated here for 2,000 years but the present main canal was made in the 1930's. Cotton is the main crop but they have also rice, and corn and alfalfa are commonly grown in the rotation with cotton.

I am told that Andizhan started about 700 years ago. The old part of the town is characteristically Near East and my guides drive through that part as fast as they can. They are ridiculously self-conscious. Yet the local people are still building the old-style houses and walls. They start with oblong balls of mud about the size of a brick. They lay these on top of one another and put on a mud facing. Many are whitewashed; some have pastel pink, green, and

especially blue. The new houses are of rectangular mud brick, a bit higher, and with fitted windows and doors within frames.

We come to the first part of the Fergana Canal that leads off the Kara-Darya (equals Black River.) Construction of the present ferro-concrete dam was in 1939. Before, they had an old wooden canal. The new canal carries water to 330,000 hectares. Last year they added another 74,000 hectares and some additional can yet be added. They also get water for this canal from the Naryn River. ~~For~~ Formerly the flow in the canal was 100 cubic meters per second; now it is 175. And so on with many details. Our local hosts get a great deal of prompting from the people from Tashkent and Moscow. (Added later: As I understand the scheme in retrospect it provides for controlling the waters from the Syr-Darya, the Naryn, and other smaller streams and thus by pooling increases the dependable supply of water.)

We are told that each state and collective farm makes an annual application for water. They specify the area to be irrigated, the crops to be grown, and their estimate of water requirements. With these applications on hand a plan is developed. Allotments are made, based on them and the estimates of the water to be available.

These people are understandably proud of this diversion dam and all the rest of it. They give us a shower of statistics that no one could or should remember (K-2597)

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K-2597. August 10, 1958. Near Andizhan. Looking up the Kara-Darya River from the low diversion dam.



K-2598. August 10, 1958. Near Andizhan. Uzbek home near the main canal. (Very late evening.)

K-2597

XIII

5

K-2597. August 10, 1958. Near Andishan. Looking
up the Kars-Bayn River from the low division
dam.

K-2598

XIII-6

K-2598. August 10, 1958. Near Andishan. Isbek
home near the main canal. (Very late
evening.)

It starts to sprinkle. To my amazement we are taken to another banquet under the trees at 5:10. Rarely have people sat to a banquet with less enthusiasm than we have. We had just risen from one at 3 o'clock! Here we have chicken, beef, sausage, salads, cheese, bread, candy, cookies, grapes, apples, nectarines, peaches, mutton and rice, melons, watermelons, cognac, vodka, wine, and champagne. It rains hard at 6:15 but instead of stopping the thing, the tables are set up again on the porch of a small house. After a few unsuccessful attempts, I finally make a toast that puts the cork in the bottle.

Now here it is about 7:00 and they take us over bad roads to look at the canals. After this rain they are positively dangerous. We make a stop where the canal is being rebuilt into two sections to avoid eroding the channel. At this spot I see a most picturesque Uzbek home. As I try to make friends with the family they are told to disappear. (K-2598)

The Uzbek people so far as I can tell are colorful, simple, and friendly.

It becomes dark and we start back. My hosts apologize for the roads which they should, but also for these picturesque Uzbek houses.

We return to the hotel about 9:00 p.m. after wasting most of our time since arrival. The Uzbek officials with us are obviously glad to see Americans. I think their self-consciousness is more because of the officials from Tashkent, and especially because of

it starts to rain. In my opinion, it is better to

another person, and the rest of it. I have

but to a person who has been in the same way. He has

just about the same as a child. He has not been

to have a child, and he has not been

receiving, and he has not been

well, and he has not been

anything but a child, and he has not been

a small house. After a few unsuccessful attempts, I finally

found that the car is in the house.

Now that it is about 7:00 and the car is in the house,

look at the car. After this rain, the car is in the house.

We have a car, and the car is in the house.

to avoid the car. At this time, the car is in the house.

Under the car. As I try to make friends with the car, the car

is in the house. (K-1234)

The car is in the house as far as I can tell. The car

is in the house.

It is in the house, and we are in the house.

There is a car in the house, and we are in the house.

to make a car in the house, and we are in the house.

the time since we were in the house, and we are in the house.

to make a car in the house, and we are in the house.

because of the car in the house, and we are in the house.

Melnikov from Moscow, than because of us. But the Uzbek sense of humor is about like that of the Indians, essentially non-existent; whereas the Russian sense of humor is very much like the American.

And so to bed.

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And so to bed.

August 11

Several Uzbeks sleep on cots in the court just under my window. They are up with the birds, and so am I.

I take a very early morning walk and try to get some pictures of the homes and courtyards. (K-2599; K-2602; K-2600; K-2601; K-2603) As I come back to the hotel several young men are exercising before the statue of Lenin in the little park. (K-2604)

We go to breakfast and I find that Dr. Cline is ill and we must leave him in the hotel. Some reported rats in their room last night. Several of the Americans are a bit nervous; I do not know what they would think of really bad accommodations. I tell Dr. Allaway that in some ways I will be glad to get them all back home. He replies: "That view is widely held."

We leave the hotel at 9 o'clock and go north of town. There are lots of children here. If the death rate is high, the birth rate must be explosive. We go on a cobblestone road with mud walls on either side, except for the central parts of the villages. In most places trees line the roads and canals.

At first we see cotton on strongly undulating soil that is said to be irrigated by pumping. I see some poor grapes and fallow after fodder crops. As we go along the grapes and other crops are better and there are rows of mulberry trees along the field lines with the cotton.

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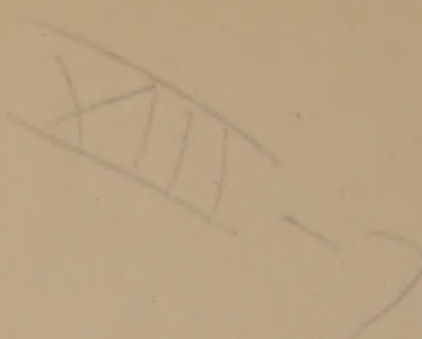


K-2599. August 11, 1958. Andizhan. Street in early morning.



K-2602. August 11, 1958. Andizhan. View from street through open door into courtyard (or alley?).

K-2599



K-2599. August 11, 1958. Andaman. Street in early morning.

K-2602



K-2602. August 11, 1958. Andaman. View from street through open door into courtyard (or alley?).



K-2600. August 11, 1958. Andizhan. A group gathered in early morning.



K-2601. August 11, 1958. Andizhan. Early morning street scene.

8-III

K-2600. August 11, 1958. Andisban. A group gathered in early morning.

1-IV

K-2601. August 11, 1958. Andisban. Early morning street scene.



K-2603. August 11, 1958. Andizhan. Picking up the sweepings in early morning.



K-2604. August 11, 1958. Andizhan. Young man doing early morning exercises before statue of Lenin.

K-2603

3-11-X

K-2603. August 11, 1958. Andrian. Picking up
the sweepings in early morning.

K-2604

4-11-X

K-2604. August 11, 1958. Andrian. Young man
doing early morning exercises before
statue of Lenin.

We go through a narrow undulating valley and an oil field with wells about one per hectare.

We stop in this dry upland above the irrigated valley and I look at the cuts. This high rolling terrace is, I believe, the remnant of very old interbedded stream alluvium, possibly early or middle Pleistocene, or even earlier. (K-2605)

We go down onto the lower plain where irrigated cotton and alfalfa are the main crops along with small patches of fodder. In the very low places I see paddy rice and marsh hay. This low area broadens out and I see considerable rice quite badly contaminated with a grassy weed. Then we are back into the large area of cotton. I see some threshing of cereals on an earthen floor that follows the old custom of southern Asia.

We pass Yakuduk, a rayon headquarters. Along here I see quite a few Uzbeks on saddle horses and a very few on donkeys. Some of the villagers have a few fat-tailed sheep.

Some of the cotton is quite spotted and some of it has nitrogen deficiency. Part of the unevenness is due to uneven irrigation related to inadequate land leveling. I see small boys herding cows, sheep, and the odd donkey. From the road one sees both old bullock carts and cultivation of cotton with tractors. Laborers, mostly women, are taking out weeds by hand.

We drive through large areas of cotton with rows of mulberry trees. These trees are kept pruned to a trunk that is about 6 to 8 feet high and the tips of the branches are 15 or 20 feet from the ground.

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We drive through large areas of cotton with rows of mulberry trees. These trees are kept pruned to a trunk that is about 6 to 8 feet high and the tips of the branches are 15 or 20 feet from the ground.



K-2605. August 11, 1958. North of Andizhan. Looking from hills down onto irrigated lower land (Sierozem).



K-2602

XIV-5

K-2602. August 11, 1950. North of Ambrosia, looking N on cliffs
down onto flattened lower land (Riverside).

We pass Kurgan Teba, another rayon headquarters. Just beyond we come to the Savay State Farm. The director, Mr. Avazmatov, greets us. We go into the office for a discussion. This farm is only a kilometer from the border of the Kirgiz Republic. Until recently the land here was dry steppe. The construction of the Sharikhan Sai Canal allowed the development of this area for farming. The name Savay comes from that of a Kirgiz man who was said to have developed the first irrigation here with a canal from the Kara-Darya. This farm is irrigated by a newer and improved canal that delivers water at 25 cubic meters per second.

The farm was originally organized in 1929 and has a total of 8,000 hectares of which 6,500 are irrigated. On the farm are 2,700 families and a total population of 8,000. They have about 4,500 workers, about half of whom are women.

The crops are given us as follows, in hectares:

Cotton	4,300
Hybrid corn for grain	230
Corn for silage	208
Alfalfa for hay	315
Alfalfa for green fodder	417
Alfalfa for seed	150
Mixed alfalfa and oats	424
Orchards and vineyards	50
Potatoes	20
Vegetables	10
Melons and watermelons	25

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8,000 hectares of which 6,500 are irrigated. On the farm are 1,100

head of cattle and a total population of 8,000. (See) have about 4,500

workers, about half of whom are women.

The crops are given as follows, in hectares:

Cotton 4,500

Wheat 250

Corn for silage 400

Alfalfa for hay 215

Alfalfa for green fodder 115

Alfalfa for seed 150

Mixed alfalfa and oats 425

Orchards and vineyards 50

Forage 20

Vegetables 10

Others and unknown 25

Besides, there are 320 hectares of the private family plots.

The livestock is as follows:

Cattle	(1957)	598
Cattle	(1958)	671 of which 236 are milk cows
Hogs		1,211
Work horses		650
Sheep		3,377

The sheep flock is being converted from a fat-tailed flock into a fine-wool one.

We are told that people start work on this farm at 18 years. Younger people are required to go to school. Women can retire between ages 50 and 55 and men between ages 50 and 60, depending on their health. This year about 30 boys and girls went away for higher education, and 45 of their people graduated from the secondary institute for mechanics.

On their staff they have 15 agronomists, 3 irrigation engineers, 4 officers for animal husbandry and veterinary medicine, and 5 mechanical engineers.

The state farm is divided into 10 sections, and in addition one for mechanics. Then each of the 10 sections has a mechanic who is a graduate from a secondary school of mechanics. These sections are comparable to the brigades of other state and collective farms. Nine of the 10 sections handle crops and one is for livestock.

Besides, there are 320 hectares of the private family plots.

The livestock is as follows:

Cattle	(1957)	298
Cattle	(1958)	671 of which 236 are milk cows
Hogs		1,211
Work horses		650
Sheep		3,377

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comparable to the brigades of other state and collective farms. Nine

of the 10 sections handle crops and one is for livestock.

The manager gives us a sample of one section headed by an engineer that looks after 430 hectares. Besides cotton, they have the following, in hectares:

Hybrid corn	30
Silage corn	20
Alfalfa for hay	31
Alfalfa for green fodder	15
Alfalfa for seed	26
Potatoes	1
Orchards and vineyards	2
Vegetables and melons	2

Each of these sections is organized into about 6 brigades.

For example, the first brigade of the first section has 82 hectares of cotton. Brigades have 15 to 20 workers each. Then besides the 5 other field brigades, each section has two complex mechanized brigades of 8 to 10 workers. Yet each cotton-growing brigade also has two tractors. Three or four members of each cotton-growing brigade look after the irrigation. The others work according to the plan of the brigade leader, but not on a specific tract of land. The brigades generally look after certain crops, such as cotton, alfalfa, and corn. Thus a brigade shifts its area with the rotation of 6 years cotton and 3 years alfalfa. Each section has its own plan in which it shifts the brigades. (This seems to me to be a rather rigid setup and must take a large headquarters staff of technicians and clerks although I don't know.)

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engineer that looks after 430 hectares. Besides cotton, they
have the following, in hectares:

Hybrid corn	30
Silage corn	20
Alfalfa for hay	31
Alfalfa for green fodder	12
Alfalfa for seed	20
Potatoes	1
Orchards and vineyards	2
Vegetables and melons	2

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For example, the first brigade of the first section has 83 hectares
of cotton. Brigades have 15 to 20 workers each. Then besides the
2 other field brigades, each section has two complex mechanized
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has two tractors. Three or four members of each cotton-growing
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of 6 years cotton and 3 years alfalfa. Each section has its own plan
in which it shifts the brigades. (This seems to me to be a rather
rigid setup and must take a large headquarters staff of technicians
and clerks although I don't know.)

The chief engineer has the responsibility for irrigation on the whole farm and one assistant distributes the water among the sections. Another assistant looks after the structures. Each section has an agronomist who instructs the workers when and how to irrigate. The chief agronomist for the farm has the final authority on the irrigation program. Section programs are reviewed and coordinated by him. When the program is completed it is given to the chief engineer who must arrange for the water to carry it out.

Each section has its own village. The salaries of the workers depend upon their position of responsibility. The brigade leader gets 500 to 700 rubles per month plus a bonus if the production exceeds the quote. Their average salaries now with the bonuses run about 900 to 1,500 rubles per month. An irrigator gets 700 to 1,000 rubles according to the work he does, rather than a guaranteed salary plus bonus. When the irrigator fulfills his quota of 0.7 hectares, he gets 26 rubles. If he irrigates more he gets 150 percent bonus for the extra area. The figure for common labor is about 17 rubles.

In the headquarters staff are three vice-directors - an engineer, an agronomist, and a business manager. There are also 5 bookkeepers, two people who work on planning, two who look after building along with 100 workers, one personnel officer, and 30 who work in the machine shops. Then there are other mechanics, agronomists, and bookkeepers in the headquarters of the sections.

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He tells me that last year they got 2.56 tons of seed cotton per hectare. (This would amount to around 1.6 to 1.8 bales of lint cotton per acre.)

I ask about the fertilizers on cotton. The total of mineral fertilizers per hectare is said to be 126 kilograms of N, 117 kilograms of P_2O_5 , and 30 kilograms KCl. They plow down 70 percent of the phosphorus in the fall. Fifteen percent of the phosphorus is applied as a side dressing before buds form and another 15 percent as a side dressing at flowering.

The nitrogen is put on in three applications as side dressings: (1) with the first side dressing of phosphorus before budding, along with organic fertilizers; (2) along with phosphorus and organic fertilizers at the stage of mass budding and flowering, and (3) at the stage of mass flowering and boll formation. Dried and pulverized farm manure is mixed with the fertilizer. They use 200 kilograms of farm manure in addition to the mineral nitrogen. They use mainly ammonium nitrate, which gives them 3 dressings of about 35, 45, and 30 kilograms of N.

On cotton that is growing one, two, or three years after alfalfa they include some potassium in the fertilizer dressings, but not on the other fields.

They do not treat the seeds with azotobacter.

They have a machine for pulling out and binding into sheaves the old cotton stalks. Part of these are delivered to the families for fuel. This year around 1,500 tons were delivered to the government for making alcohol.

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Irrigation practices depend upon the state of the cotton; and some soils take more water than others. Generally they irrigate 4 to 6 times.

From what they say the soil situation must be nearly ideal. Generally the soil is silt loam or silty clay loam around 3 meters deep over gravel. The water table is said to be down at about 100 meters. Normally during the growing season they get 35 to 40 millimeters of rain; but this year they had 90. They use about 800 to 1,000 cubic meters of water per hectare for each application.

Some fields require a little leveling every year but they have very little heavy leveling to do.

Although many collective farms grow silkworms they are not grown on this state farm. Adjoining collective farms use some of the mulberry leaves produced on this farm. Normally, alfalfa yields about 7 to 8 tons of hay but this year they expect 9. This crop gets about 120 to 150 kilograms of P_2O_5 per hectare. This is applied once in March, along with disking. The alfalfa is cut 4 times and pastured in the fall.

They receive 1,800 rubles for a ton of seed cotton. The primary cost for growing a ton of cotton is said to be 1,550 rubles. The farm buys back some of the cotton cake for feeding cattle. They seed cotton at a rate of 50 to 60 kilograms per hectare, in check rows.

One of the Americans asks the director what his salary is. His basic salary is 2,700 rubles per month but if the farm plan is over

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One of the Americans asks the director what his salary is. His

basic salary is 2,700 rubles per month but if the farm plan is over

fulfilled, as he expects it will be, it will amount to 4,000 rubles per month.

I am shown a copy of a small-scale soil map, (1:50,000) made of this farm in 1932.

We then go to lunch. A beautiful table is arranged under a grapevine arbor back of the small hotel on the farm. The excellent lunch is ended at 2:00 p.m. We then take a walk through this headquarters village. I go into one of the new houses. Besides the kitchen it has two other small rooms. The kitchen has a small electric refrigerator. Under one of the beds I see a chest and remark that if I were further south I would assume this to be a dowry chest. My interpreter asks the owner about the chest and it is his wife's dowry chest. So some of the old traditions remain in spite of the new ideas.

There is a nice store on this farm and many other new houses. (K-2606; K-2607) A fine new clubhouse with a theater is substantially completed. I go into a 75-bed hospital for the people on this farm. The staff and facilities are neat and clean.

We walk into a school for 1,200 boys and girls, which is quite good. Both the school and hospital are supported by the government. The school is run by the government but the state farm built the building and furnishes accommodations for the teachers. I see several more new houses and others being built. Many trees have been newly planted.

fulfilled, as he expects it will be, it will amount to 4,000 rubles per month.

I am shown a copy of a small-scale soil map, (1:50,000) made of this farm in 1932.

We then go to lunch. A beautiful table is arranged under a grapevine arbor back of the small hotel on the farm. The excellent lunch is ended at 2:00 p.m. We then take a walk through this headquarters village. I go into one of the new houses. Besides the kitchen it has two other small rooms. The kitchen has a small electric refrigerator. Under one of the beds I see a chest and remark that it

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K-2606. August 11, 1958. North of Andizhan. New home on Savay State Farm.



K-2607. August 11, 1958. North of Andizhan. Same new home from the street.

XIX-6

K-2606. August 11, 1958. North of Andisban. New home on
Crazy State Farm.

XIX-7

K-2607. August 11, 1958. North of Andisban. Same new home
from the street.

Then we go into the fields and look at the cotton. (K-2608)

The irrigation is not well controlled. (K-2654) I also see some good corn and some oats now being cut by a combine harvester.

I had asked the manager how they apply their fertilizers. He had told me that although it was out of season they would demonstrate. We go to the place of demonstration. They have sieved dry manure and mix 2 parts of it (by volume) with one part of superphosphate. (K-2610) This superphosphate has 18 percent P_2O_5 . Then they have a pile of ammonium nitrate in rather poor physical condition that runs 34 percent nitrogen. (K-2611) The machine is a tractor-mounted cultivator with a fertilizer applicator. It has two large circular containers for the fertilizer. Each one leads to four outlets. Each of these containers is divided by a small board. The mixture of manure and superphosphate is put on one side of each of the two containers and the ammonium nitrate on the other. Thus each row of cotton gets the mixture on one side and the ammonium nitrate on the other side. The reason for this mixing of the dry manure and superphosphate given is that according to Lysenko the phosphorus is made more available. (I doubt this very much.) The machine seems to work well once they get it adjusted. (K-2612)

The manager says that two years ago they got 100 kilograms of cotton for 8 man-days of labor and now they get it for 4 man-days. Last year they got 7.2 tons of seed cotton per worker and this year they expect 10 tons. These figures do not mean much to me without knowing more precisely how they are calculated and with what included overhead.

Then we go into the fields and look at the cotton. (K-2608)

The irrigation is not well controlled. (K-2609) I also see some

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they expect 10 tons. These figures do not mean much to me without

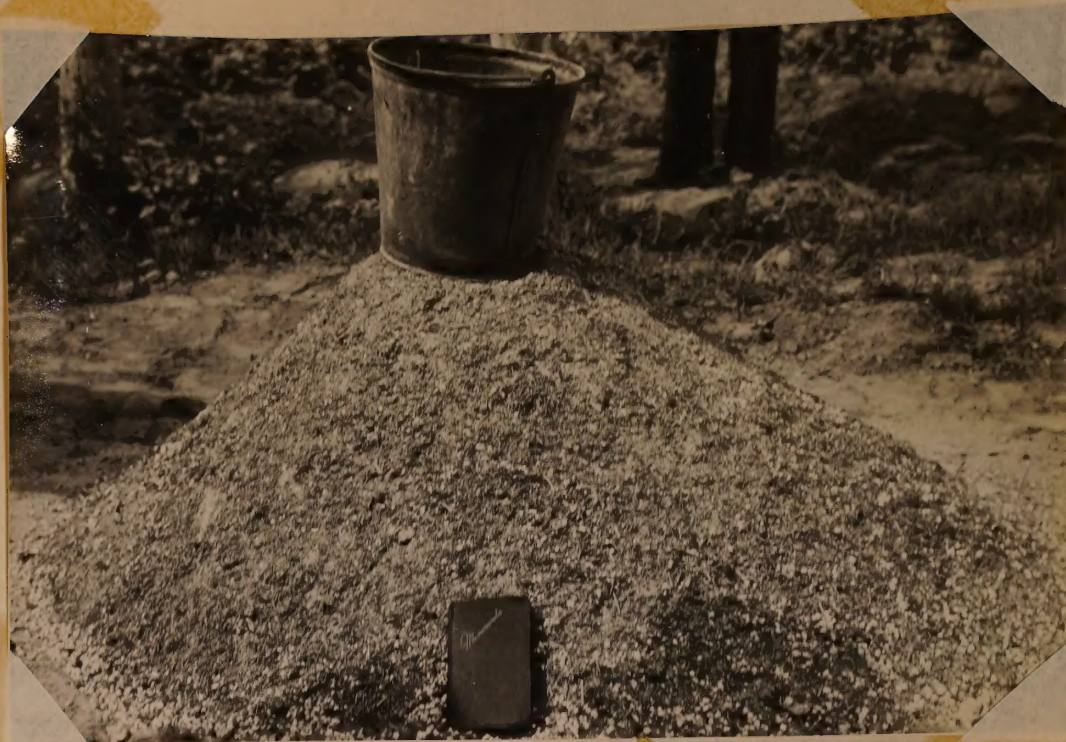
knowing more precisely how they are calculated and with what included

overhead.



K-2608. August 11, 1958. North of Andizhan.
Typical cotton field Savay State Farm.

K-2608. August 11, 1958. North of Andizhan.
The specimen is a typical cotton field gnat.



K-2610. August 11, 1958. North of Andizhan. Savay State Farm. One part superphosphate and 2 parts dry manure, by volume.



K-2611. August 11, 1958. North of Andizhan. Savay State Farm. Ammonium nitrate for side dressing cotton.

2612

XV-2

phosphorus
aluminum
time.

K-50

1192-21

XV-3

was

K-50



K-2654. August 11, 1958. North of Andizhan. Savay State Farm.
Irrigating cotton.

K-2524. August 11, 1950. North of A. Highway. New State 10. Investigating person.



K-2612. August 11, 1958. North of Andizhan.
Cultivator with fertilizer attachment
mounted on tractor. Savay State Farm.

K-2612

IV-7

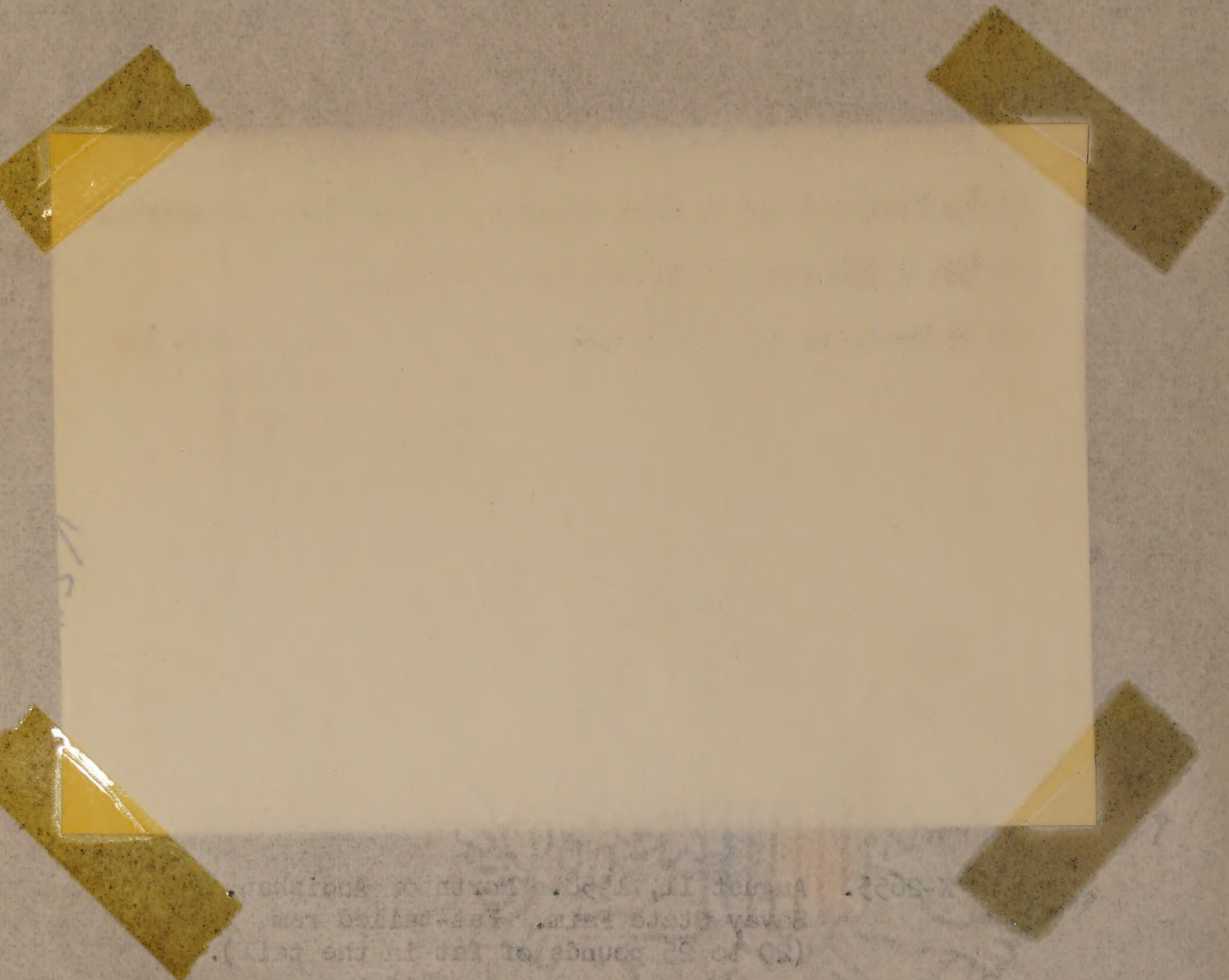
K-2612. August 11, 1958. North of Andover.
Cultivator with fertilizer attachment
mounted on tractor. Navy State Farm.

We next go over and look at the corn, which is a hybrid called VIR 42. The ears look good and there is a rather high ratio of grain to fodder. Both the manager and I, independently, estimate a yield of about 3 tons of grain per hectare.

The manager asks me what I think of his farm. I tell him that it is a good farm but that with more experience with herbicides they could cut out a lot of the individual work and increase yields. He says that he agrees with this point of view. I go on to tell him I don't think it is wise to try to change methods too rapidly. These people have their own ways and their working lives are tied in with the rest of their lives. If one tries to change too rapidly people are likely to become somewhat unadjusted and in extreme cases there are serious moral breakdowns and other deficiencies that offset the gains in labor efficiency. (I don't think the leaders here have given enough attention to this point of view. Obviously, he had not thought much about it.)

After looking over the farm we are taken again to the grape arbor for supper. The people here are certainly very friendly and cordial. I had told the manager that I lacked a good photograph of a fat-tailed sheep. We are hardly at the table before a man brings in two beautiful specimens. One is a 7-month-old ram with a fat tail that must weigh 20 to 25 pounds. (K-2655)

Of course this is another Uzbek feast with toasts and flowers. The drinking is not so heavy on this farm.



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...and then in the town called ...
...the days that were ...
...to look at ...
...of about 5 ...
...the manager ...
...this is a ...
...could be ...
...says that ...
...don't ...
...people ...
...the ...
...the ...
...are ...
...seems ...
...and ...
...such ...
...first ...
...for ...
...I ...
...and ...
...and ...
...to ...
...of ...
...is ...
...is ...

We leave at 6:50 p.m. and are back to the hotel at 8. An arrangement has been made for me to see some of the "local handicrafts," in one of their stores, not in a bazaar. Most of what they show me has come from Moscow and is not very good.

Cline is better now and Dr. Allaway is in good spirits.

These soils here are quite good indeed. I saw today no significant salinity but I did see a little iron chlorosis.

I am fairly early to bed after one of our best days. This was a good farm under a good manager.

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August 12

We are up early to pack and then go for breakfast on a collective farm called Sverdlov. We leave the hotel at 7:00 a.m. and drive southeast. For a long way we see cotton and mulberry trees on either side of the road. This is a beautiful landscape in the early morning sun. We pass through a collective farm called Stalin. The mud walls along the road conceal the homes.

We pass Leninsk, a rayon headquarters with a cotton gin and a hydro-electric plant.

As we go on the valley narrows. Along the side of it is a steeped-faced escarpment in an ancient alluvial or lacustrine deposit. The bedding is fairly even. It is possibly Tertiary, or more likely Pliocene. Since the old plain was strongly dissected the edge of the fresh escarpment is very uneven.

As we go on the valley broadens again. Most of the cultivated land is used for cotton and mulberries but there are some fields of alfalfa and fodder crops and the private plots have fruit, fodder, and vegetables. To the south I see a range of jagged peaks covered with snow.

We pass Markhamat, another rayon headquarters, and come to the Sverdlov Collective Farm, which is obviously better than most. We arrive at 8:00 a.m. and already the loud speaker at the headquarters is blaring forth.

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We meet the chairman, Mr. Dadgibaev, a solid Uzbek who has been chairman of this farm for 20 years. Since he speaks only Uzbek, again we have a double translation. Thank goodness Mr. Melnikov, or someone, gets the girls to remove the liquor bottles from the breakfast table.

After breakfast we go into the farm office. The farm was organized in 1931 and has a total area of 3,000 hectares, of which 1,590 are irrigated.

The land is used as follows, in hectares:

Cotton	1,200
Alfalfa	250
Corn for grain	15
Corn for silage	85
Orchards and vineyards	40
Pasture	1,400

The livestock includes, 510 cattle, of which 160 are milk cows, 115 horses, and 2,900 fat-tailed sheep of the Gissar breed.

They have 31 tractors of all types, 11 trucks, 3 cars, and the usual tillage machinery.

Last year their yield of seed cotton was 3.6 tons per hectare (about 2.2 to 2.5 bales of lint cotton per acre) and this year they expect 3.7 tons.

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Here the 1,200 hectares of cotton are divided among 20 cotton-growing brigades. Besides they have brigades for alfalfa, livestock, and two for orchards and vineyards.

The farm has 940 families including 1,400 workers, of which one-half are said to be women (although it looks to me as if there were more women than men.) We are told that pregnant women or those with small children do not work in the field. People live in 9 villages on this farm.

I am told that last year one labor-day paid:

18.7 rubles

2.5 kilograms grain. The government sells them up to 350 kilograms of grain for each ton of cotton delivered.

25 grams of meat by live weight (or 2.5 kilograms for each 100 labor-day units).

250 grams of grapes.

5 kilograms of silage.

As much hay as needed, from the meadows.

The average laborer gets about 300 to 400 labor-days per year.

A total of 527,000 labor-day units were earned on the farm last year.

Each family has .14 hectares for its own use. Most have one or two cows, about 10 sheep, and some poultry. A few farmers have bees.

On this farm there is a secretary of the local Communist Party organization "to work with the local people in order to bring them up in the right way, to help the chairman reach the goals of the farm,

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As much hay as needed, from the meadows.

The average laborer gets about 300 to 400 labor-days per year.

A total of 227,000 labor-day units were earned on the farm last year.

Each family has 14 hectares for its own use. Most have one or two

cows, about 10 sheep, and some poultry. A few farmers have bees.

On this farm there is a secretary of the local Communist Party

organization "to work with the local people in order to bring them

up in the right way, to help the chairman reach the goals of the farm,

and to work with the children as a sort of social director." We are told that this is a full-time political and propaganda job.

They tell me that women laborers may retire at 55 and men at 60 or earlier on account of health. We are told that when a laborer retires the size of his pension is 80 percent of the average number of labor-day units of the previous four years. A young man, hurt on the farm and unable to work, would get a pension calculated in the same way.

The farm has six schools of which two are 10-year schools, attended by 1,500 children. The farm has a nursery, hospital, and a nearly completed new clubhouse.

Last year 4,440 tons of cotton were delivered at a price of 4,800 rubles per ton including bonuses for exceeding the plan. Then we are told that total gross income is 17,620,000 rubles. According to my information yesterday from the state farm they had 1,800 rubles per ton. (Added later: This figure of 4,800 rubles must be seriously in error, yet Mr. Bulik got the same figure. Likely the correct figure is 1,800 or a bit more.)

This farm has 20,000 mulberry trees. Last year they delivered 27 tons of silkworm cocoons. The silkworms are produced in the houses of the individual farmers. They are paid so many labor-day units for the cocoons. Now I'm told that three brigades handle the silkworms. Each one has a special "agronomist."

The staff includes 2 agronomists, 2 agro-technicians, one animal husbandry officer, 2 hydro-technical engineers, and one civil engineer.

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The staff includes 3 agronomists, 2 agro-technicians, one animal

husbandry officer, 2 hydro-technical engineers, and one civil engineer.

With four other collectives, a joint hydro-electric power station of 600 kilowatts has been built.

The farm builds houses for its families. Last year 40 homes were built and this year they will have 100 more new ones. The farm has an account of 10,000,000 rubles for construction. The farm builds the houses and the farmer pays back in 10 years by installments. Unfired brick houses cost 12,000 rubles, and those of fired brick 28,000 rubles. The loans bear no interest. If the purchaser becomes ill the committee may free him of further payments. The living space in one of these houses is 60 square meters in three rooms. Last year 15 percent of the farm income was put into the development of the farm and the rest divided. This year they will put in 20 percent.

When a collective farm borrows money from the agricultural bank they pay 2 percent interest.

They tell us about how they fertilize cotton: they apply 100 kilograms per hectare of P_2O_5 . Seventy-five percent is plowed down in the fall and 25 percent applied in two or three side dressings during growth.

They apply 100 kilograms of N out of which 25 percent is plowed down in the fall. The rest is added during the vegetative period, usually in two applications, sometimes in three. They use either ammonium nitrate or ammonium sulphate.

For the fields that have yellow leaves on the cotton they apply 30 kilograms of K_2O as potassium chloride.

During the flowering period they apply a leaf spray of phosphatic fertilizer from planes. For the side dressings, they mix the nitrogen and phosphorus with dry, unpulverized farm manure. By July 20 they have normally completed fertilization.

On the "meadow" soils they irrigate 2 or 3 times during the vegetative period, and 5 to 8 times on the Sierozems. Rates vary from 800 to 1,000 cubic meters per hectare. The length of run is about 80 to 100 meters with furrows 50 centimeters apart on the Sierozem; whereas on the "meadow" soils they irrigate with every other furrow. The time of irrigation runs from 24 to 48 hours. The water table here is at 2 meters or more.

We walk out into the cotton fields and then drive around to other parts of the farm. I see some veiled women in very colorful dress but they don't want to be photographed. We see the nursery and then go to the livestock section. (K-2614)

The dairy barn is now clean and neat but I doubt that it is all the time. The feeding troughs are concrete, the floors for the cows are wooden, and the passageways are earth. The milking is done by machine. The cows have been running about 1,200 kilograms of milk each. Today they had 527 kilograms from 72 cows. (If they have a total of 160 milk cows there must be another brigade.) I'm not particularly impressed with this breed of cows. The manure is removed from the barn on a carrier on a track. There are also tracks for the fodder. The stalls have automatic watering dishes. It must be difficult to keep the barn clean.

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K-2614. August 12, 1958. South of Andizhan.
Barnyard of Sverdlov Collective Farm.



K-2615. August 12, 1958. South of Andizhan. Cotton field
on Sverdlov Collective Farm. A few mulberry trees.

2-XX
K-2614. August 12, 1958. South of Andzhan.
Baryard of Sverdlov Collective Farm.

2-XX
K-2615. August 12, 1958. South of Andzhan. Cotton field
on Sverdlov Collective Farm. A few mulberry trees.

We see some more cotton fields, which I photograph (K-2615), and then return to the headquarters for lunch at 11:05. (K-2656; K-2616) A beautiful luncheon table has been set up under the trees. Of course we have the usual toasts and so on. These Uzbek people are very kindly and hospitable. (Yet I think I have broken a tooth with a big sand grain in the bread.)

We leave for the airport at 12:05 with flowers and gracious farewells. By making very long toasts we have been able to limit the intake of food and drink since Melnikov wants to be sure that we make the plane.

On the way back I try to photograph the curious escarpment I saw on the way out along the Sharakhan-Sai River. I still can't make up my mind about the geological age of this old dissected surface. The ridges between the gullies are cut back by the stream at a very steep angle of repose.

After all the hurrying we reach the airport with time to spare. Melnikov says that all of our transport here has been furnished gratis by the local Oblast. I note a great many small planes here on the ground.

One of my guides tells me a typical Russian joke: A member of a collective says, "We have a nice swimming pool where people swim and dive. The chairman has promised that next year we shall have water for the pool."

We see some more cotton fields, which I photograph (K-2615).

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K-2656. August 12, 1958. Near Andizhan. Sverdlov
Collective Farm. Old men of the village.

K-2556. August 12, 1958. Near Andishan. Sverdlov
Collective Farm. Old men of the village.



K-2616. August 12, 1958. South of Andizhan. A small Uzbek citizen.

14-2616

XV-8

K-2010. August 12, 1976. South of Arlington. A small
Upper section.



The wheels are in the air for Tashkent at 1:06 p.m. There are many villages along the roads. This combination of cotton and rows of mulberry trees make a pleasing view from the air. This part of the valley must be very heavily populated but after some 20 or 30 miles the villages are smaller and further apart. The fields are mottled with saline areas. We were certainly shown the best areas. Out 30 to 40 miles salinity is very bad indeed where we fly but the land looks good to the south. I was told that during early irrigation all the drainage water with salt was allowed to accumulate in a depression. It is said that parts of this saline area are being reclaimed and I see ditches in saline areas having no crop at all. Soon after flying over some wasteland we are over good country with many villages and few evidences of salt. We cross the Kara Darya River and come hear a city that may be Kokand. The soil becomes poorer even as we cross the Syr-Darya River near a large water-storage area.

The plane rolls and jerks as we go over the hills to Tashkent.

The wheels are down at 2:10 p.m. I go to the hotel and clean up. Then we take a short walk along Karl Marx Street where the main shops are. I buy a silk scarf, a map of Uzbekistan, and a small print.

Although some shops and department stores are better than others, goods are not at all well displayed. Most second quality material is very expensive and one sees few things of first quality. Only a few local handicraft articles are offered. Perhaps cottage industries

never flourished much; perhaps they are being discouraged; or perhaps people do not buy them.

The costume jewelry is very poor but not cheap. Real jewelry is very expensive. Since all prices are fixed, and the same in all stores, there is little incentive for attractive displays. Yet the shops and the department store I visit are very crowded with customers.

We are back to the hotel for dinner and early to bed. Tomorrow promises to be a very long hard day.

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The costume jewelry is very poor but not cheap. Real jewelry

is very expensive. Since all prices are fixed, and the same in all

stores, there is little incentive for attractive displays. Yet the

shops and the department store I visit are very crowded with customers.

We are back to the hotel for dinner and early to bed. Tomorrow

promise to be a very long hard day.

August 13

Unhappily, I am up early again this morning. I walk around the main square for the last time. The sky is cloudless and this promises to be a hot day in Tashkent.

About 10 a.m. one of our hosts goes with Dr. Cline and me to collect a surface soil of Sierozem. About 12 kilometers northeast of Tashkent we take a surface sample from an old mesa that is now under dry natural vegetation. The soil is from loess and seems not to have been cultivated, at least for a great many years.

I take the samples 4 inches deep. The soil is a brown (10YR 5/3) silt loam. The surface one inch is slightly platy. The soil is generally firm, but easy friable to moderate granular. I also take a sample of the vegetation. (K-2617)

We are back at the hotel at 11:05, pack, change our clothes, and make ready for a final conference with our Tashkent hosts.

They tell us that it is planned to irrigate 2 million hectares of new soil in the USSR by 1965 of which 700,000 hectares are in Uzbekistan. These hectares are mostly salty. The reclamation process goes through 4 main steps: (1) Removal of weeds and grass, (2) leveling, (3) deep plowing with moldboards, and (4) division into plots of .25 hectares surrounded with bunds that are 30 to 40 centimeters high. Each plot is separately supplied with water. They do not run water from one plot to another. This required 40 liters per second into each plot to flood quickly. At slower rates, more total water is required. The leaching is done in cooler weather, usually in September and October.

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Unhappily, I am up early again this morning. I walk around the main square for the last time. The sky is cloudless and this promises to be a hot day in Tashkent.

About 10 a.m. one of our hosts goes with Dr. Cline and me to collect a surface soil of Sierozem. About 12 kilometers northeast of Tashkent we take a surface sample from an old meadow that is now under dry natural vegetation. The soil is from loess and seems not to have been cultivated, at least for a great many years.

I take the samples 4 inches deep. The soil is a brown (10YR 5/3) silty loam. The surface one inch is slightly platy. The soil is generally firm, but easy friable to moderate granular. I also take a sample of the vegetation. (K-2617)

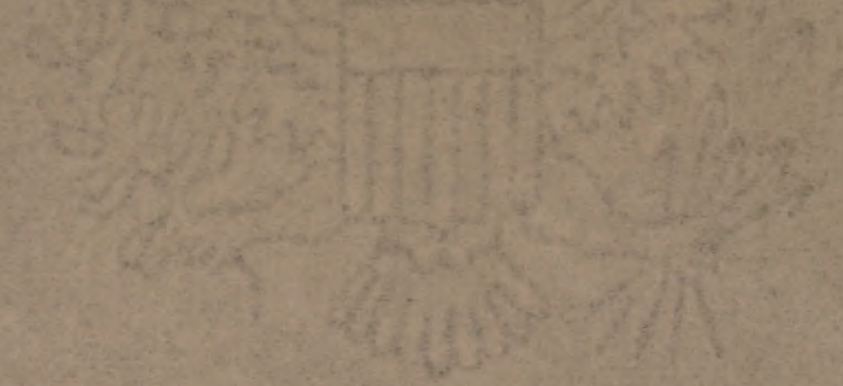
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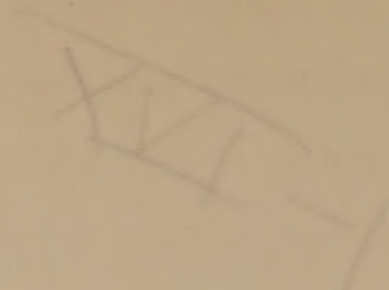
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K-2617. August 13, 1958. 12 km. east of Tashkent. Site of Sierozem surface soil sample. Dr. Cline in foreground.



K-2619



K-2619, August 11, 1953. 12 mi. east of Madison, State of
Idaho. 8000 ft. alt. Soil sample. 20. 20 ft. in foreground.



They check the chloride ion and require a maximum of .01 percent in the first meter of soil prior to sowing. The underground water should be lower in salt than 10 grams per liter.

Through research and experience they have developed curves for the various soil conditions used to predict the water needed. The amount required varies from 3,000 cubic meters for sandy soils with relatively low water tables to 25,000 cubic meters per hectare for clay soils with shallow water tables. Solonchaks requiring 25,000 cubic meters are used for rice. The rice is planted after 2 or 3 floodings within the bunds. But when the chloride ion drops below .01 percent, any crop may be grown. Sunflowers are quite tolerant of salt; they can grow with .07 percent chloride ion in the first meter. Mangel-wurzels can endure .06 percent. According to their experience they give the following upper limits for several crops:

Crop	Percent chloride ion
Alfalfa	.01
Cotton and grain sorghum	.045
Oats and barley	.02 to .03
Mangel-wurzels	.06
Sunflowers	.07

They have tried irrigated cotton with water having up to 7 grams of salt per liter. They find they can grow to 4 to 5 tons on well leached soils with good drainage systems and yields hold up. They try to leach these fields every year or two with river water.

They have reclaimed Solonchaks with as much as 13 percent salt and after leaching had 4 tons of cotton per hectare. Here 1 cubic meter of water takes out 3 to 15 kilograms of salt, depending on the soil.

There follows some discussion. It seems to us that they apply much more water than necessary if adequate drainage were provided. They measure the water that goes onto the farm but we question how it is really divided among the fields.

We have lunch, go out to the airport in the little bumpy bus, and then wait for the plane. Here at the last minute I am given a soil map. This is a copy of one that I had wanted to photograph at the Akkavak Station; but it is not the one I most wanted.

The wheels of this very hot little plane are off the ground for Alma-Ata at 3:40 p.m.

In 7 minutes the good cropland fades out except in favored places. I see some cereal on dryland and some inadequately irrigated soils except for good irrigation around the village sites. At 3:55 there is poor wheat farming and very little irrigation. By 4:01 the land is too dissected for grain except in small patches. We pass the outliers of the mountains to the south. The rocks are folded. Probably they are sedimentary. Here and there I see some grain fields but rather poor small villages with irrigated family plots. Both dry farming and irrigation improve for a ways but they are very patchy. I see flat-topped elongated remnants of older landscapes that have on them irregular stubble fields. The entrenched streams give a very

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on them irregular stony fields. The entrenched streams give a very

complex pattern of grazing land and cereals with a bit of irrigation in favored places, especially at village sites.

At 4:16 p.m. we begin to fly over low jagged mountains with poor cover, then another valley, low mountains, and still another valley.

We pass Dzhambul. I see the ~~Ala-Tau~~ Ala-Tau Mountains to the south that have snow on them. They are said to run up to 3,000 meters.

As we go on this mountain area gets much greener and would seem to have good grazing. The mountains are said to be a part of the Chungur Range with peaks up to 1,380 meters.

The wheels are down at 5:19 in Frunze. We have time enough for tea. The wheels are up again at 6:02.

We pass over irrigated fields. I am not sure of all the crops, but I think I see cereals, fallow, meadow, corn, sunflowers, and rice.

The soils are darker brown. At 6:10 we are over strongly rolling to hilly grazing land with cereals on the mesas and at the margins in favored places.

We come down for Alma-Ata, the fields have corn, sunflowers, and meadow with grazing cattle. There are beautiful snow-capped mountains just south of the city. (K-2618) At the moment the area is wet and seems to be well irrigated with water from the mountains.

The wheels are down at 6:48 in the middle of a muddy airport that is being rebuilt. The rainfall is fairly good here and runs up to 800 millimeters.

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tion in favored places, especially at village sites.

At 4:15 p.m. we begin to fly over low jagged mountains with poor cover, then another valley, low mountains, and still another valley.

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As we go on this mountain area gets much greener and would seem to have good grazing. The mountains are said to be a part of the Chugur Range with peaks up to 1,380 meters.

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K-2618. August 13, 1958. Alma Ata. View from
front of airport.

K-2618

XVI-2

K-2618. August 13, 1958. Alma Ata. View from
front of airport.

We have quite a wait in this airport without food or tea. Finally we get into a battered old plane for the trip to Akmolinsk. The wheels are up at 7:54 p.m. Recent rains have soaked this area. For 7 or 8 miles the land is cut up with meandering streams that have many gullies running back from their banks. By 8:02 we are already over wasteland and it is most too dark to see clearly. I see several corrals so there must be some grazing animals. The mezzo-relief suggests a windswept hard rock and cover sands.

About 8:06 I see a few fields of cereal on rather bumpy land but most is undulating. As we go on, the fields become fewer.

At 8:18 we pass Kurtu. The rainfall must have dropped below the minimum for crops. The Ili River is a meandering braided one. There is a fairly strong mezzo-relief with outcrops of rock or possibly of [^]croute calcaire.

It is a terrible pity that we must pass over this great area at night. We cross the river at 8:35 and the local relief suggests old lava flows. Now we have nothing ahead but the long grinding hours in this old plane - hours to wish I were back at home, and once there, to stay at home.

At 9:25 we pass over Balkhash then come down in Karaganda at 10:45. We are taken to an extremely hot little dining room for food, much of which we share with a swarm of flies. We are soon called back to the plane and wait while workmen put in a large number of extremely heavy boxes. It would seem that this plane must be terribly overloaded.

We get into the plane at 11:30 p.m., but nothing happens. We just sit. For the local citizens, I hope this is not the God forsaken place it seems to be.

The wheels are up at 11:58. And thus one day passes into another.

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August 14

The wheels are down at Akmolinsk in Kazakhstan at 12:42 a.m. A large delegation from the local Akmolinskaya Oblast meets us. They help us take out our baggage that is loaded into cars. We drive east and go only through the edge of the city on a terrible road to a kind of small camp. There is a central building for the dining room and offices, and little cottages filled with beds. We arrive at 1:30 a.m. and discover that we must go to a banquet within 10 minutes! What a place!

The chief agricultural administrator for the Oblast is Mr. Sergei Nikolaevich Strukov. He seems like quite a tough old bird. He acts as chairman for the usual banquet, with much urging to drink, toasts, and all the rest of it. Mr. Melnikov had been ill on the plane; but he says now that he feels fine from taking salt and vodka! I get to bed about 3:20 a.m.

I am up at 7 a.m., and not very bright. It is partly cloudy, but generally sunny and warm.

Even at breakfast this morning we are urged to drink. Everyone seems tired, even our hosts. These hours are ridiculous but apparently all is in accord with local custom. Mr. Melnikov is too ill to go with us this morning. He is in pain and a physician has been called for him. I doubted last night the medicinal value of salt and vodka, especially the vodka.

We finally leave for the field at 10:30 a.m. The rainfall in this Oblast varies from 250 to 320 millimeters per year. Minimum winter

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Oblast varies from 250 to 320 millimeters per year. Minimum winter

temperatures are about -40°C . They have occasional summer frosts.

The last one was in 1946.

I see that we are in the plain of either Brown or Chestnut soils, treeless except for a few old groves and a few young shelterbelts. The Oblast has 15,000,000 hectares of which about 4.6 million are under crops. They have 3.6 million hectares of wheat and .4 million hectares of other crops. Plowable land in perennial grass is not included. In 1954 they had only 1,100,000 hectares of cropland. On the cultivated land they have about 1 year of fallow with 2 to 3 years of grain. On the virgin soils they start out with spring wheat for 3 or 4 years.

I see some thickly-sown corn for fodder. The soils are slightly reddish-brown light Chestnuts (Brown soils) with considerable solonetzic influence and some spots of Solonetz. I am told they also grow a little winter rye for green fodder but only enough rye is harvested to give them seeds. They also have some oats and millet.

As we cross the railroad I notice a great many box cars. They tell me that they now have 11,000 of these in reserve for storing and shipping grain.

They use special machines for ridging the snow in the fields. This is done two or three times in the winter in order to get a layer of 50 to 60 centimeters of snow. In the fall they do not disturb the stubble and cultivation is said to be done by a modified Canadian machine. Because of June droughts they dare not sow the wheat early. They sow usually in the latter part of May since most of their rain

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machine. Because of June droughts they dare not sow the wheat early.

They sow usually in the latter part of May since most of their rain

comes in June and early July. This year they expect an average of 1.3 to 1.4 tons of wheat per hectare. Oats are expected to be somewhat more. They tell me that this single Oblast produces one-half as much wheat as the Ukraine.

I see a large group of cattle out to pasture. In places I see some evidence of salt in the low ground and of Solonetz.

I am told that only small plots of vegetables are irrigated. In the whole Oblast 232,000 hectares are irrigated by flooding and 5,000 by furrows.

As we enter the suburbs of Akmolinsk, I see many of the old-style wooden houses, mostly unpainted, with carvings on the window frames, the shutters and the boards just under the eaves. There are many low one-story, mud-brick and mud-plaster houses in the town. The roads and streets are either very muddy or, as now, very rough and dusty. I see a few new two-story apartments of cement blocks. Certainly this is an unattractive city. (Under statement!) We drive through just the edge of the city and do not see the main part. (I get the odor of oil as from a cracking plant.)

We go generally west and then northwest in the direction of Shortandy. I see a few young shelterbelts, some goats, and quite a few cattle. We pass a large field of corn and stop on the collective farm called "Dawning." This corn for silage is about $6\frac{1}{2}$ feet high. (K-2657) Next to the corn are potatoes, which they expect to yield about 15 to 18 tons per hectare. We also see good oats and good wheat. They expect the wheat to yield 1.4 tons per hectare.

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K-2657. August 14, 1958. North of Akmolinsk. Corn for silage on dark Chestnut soil (loam). (S. N. Strukov).

USSR WAC 235D STALINGRAD NR 48 42 N 44 30 E

CRACKING ALONG IRRIGATION FURROW OF SOLONETZIC BROWN SOIL ON FORTIETH ANNI-
VERSARY OF OCTOBER COLLECTIVE FARM SOUTH OF TOWN (TOMATO CROP). 5 AUGUST 1958.

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(24)

CIA 368159

K-2657. August 14, 1958. North of Almaty. Corn for
stages on dark Chestnut soil (loam). (S. M. Strukov).



K-2619. August 14, 1958. North of Akmolinsk.
Wheat on dark Chestnut soil. Around
1.4 tons per hectare. (Oblast agronomist).



K-2619

XVI - 3

K-2619. August 14, 1954. (1954-1955).
Shed on Oak Creek and L. A. and
L. A. for history. (1954-1955).

(K-2619) They seed 110 kilograms per hectare. The stand looks a bit thin to me. The wheat here is a bit green yet. They will windrow it and then follow with a pickup combine harvester. In this way they avoid shattering and the extra work of drying the grain.

These crops are on Chestnut loam that looks something like the soils of western North Dakota on smooth relief. So far they have made no attempt to reclaim lands with much Solonetz, although I see one very large wheat field that has some micro-relief suggesting mild Solonetz.

We go on by large pasture areas with small, widely-spaced spots of Solonetz and some slight efflorescence on the ditch banks.

Because of their winters here the cattle are fed for about six months. They use wild hay, some alfalfa, crested wheatgrass, sanfoin, couchgrass, straw, corn silage, and sunflower silage. The silage is made between two hay stacks about 5 to 6 meters apart. This is packed with tractors and covered with straw.

We pass a village with small, low whitewashed houses. They have some windows and the roofs are nearly flat. And then we see another field of corn that is much less good than the previous one.

It would be my judgment that much of this Chestnut-Solonetz complex that they are carefully avoiding could be plowed and made ready for crops without too much trouble.

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It would be my judgment that much of this Chestnut-Solonchaks complex that they are carefully avoiding could be plowed and made ready for crops without too much trouble.

This Dawning Collective Farm has 24,000 hectares for crops out of a total of 56,000 hectares. Apparently we are just driving through. We pass a field of sunflowers that will not ripen but will be cut green for silage. The Administrator tells me at this point that they have 1,100,000 sheep in this Oblast and 550,000 cattle. Of these cattle 87,000 are cows, but only 55 percent of them are considered milk cows.

I stop to take a picture of a village in the Voroshilov Collective Farm. (K-2620) My guide tells me that this is a temporary brigade camp! Although it doesn't look very good these are obviously permanent homes. Near the houses are piles of manure bricks for fuel. I notice also a small wind-power electric station for the village and for a cattle barn. I am told they use diesel power when there is no wind. The many little ponds around here testify to recent rains.

We talk a bit about reclaiming Solonetz. Where they do it they start out with a heavy-duty tractor and disk and then plow to 40 centimeters without moldboards. The soil is fallowed for one year and then planted to perennial grasses, especially alfalfa and crested wheatgrass together. This is left to grow for 4 or 5 years and then the best parts are used for grain. It is too bad that they have no sulphur or gypsum to apply to these soils. Yet what is called Solonetz here we would call solonetzic Chestnut soil with a few spots of weakly developed Solonetz.

This Dawning Collective Farm has 34,000 hectares for crops out of a total of 56,000 hectares. Apparently we are just driving through. We pass a field of sunflowers that will not ripen but will be cut green for silage. The Administrator tells me at this point that they have 1,100,000 sheep in this Oblast and 250,000 cattle. Of these cattle 87,000 are cows, but only 25 percent of them are considered milk cows.

I stop to take a picture of a village in the Voronezh Collective Farm. (K-2623) My guide tells me that this is a temporary brigade camp. Although it doesn't look very good these are obviously permanent houses. Near the houses are piles of manure bricks for fuel. I notice also a small wind-power electric station for the village and for a cattle barn. I am told they use diesel power when there is no wind. The many little ponds around here testify to recent rains.

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K-2620. August 14, 1958. North of Akmolinsk. Village on Voroshilov Collective Farm.



K-2621. August 14, 1958. North of Akmolinsk. Site of surface sample of dark Chestnut soil. Virgin soil. Some solonetzic spots.

01-11-58

IX
7

K-2020. August 14, 1958. North of Akmolinsk. Village on
Voroshilov Collective Farm.

K

IX

5

K-2021. August 14, 1958. North of Akmolinsk. Site of surface
sample of dark Chestnut soil. Virgin soil. Some
solonchetic spots.

We stop in the virgin steppe and I get a surface sample of the dark Chestnut soil to a 4-inch depth. (K-2621) This is a very dark grayish-brown (10YR 3/2) silt loam with fine granular structure. The top half-inch is slightly platy. The surface is nearly level and there are few slight depressions with Solonetz. I also take samples of the vegetation which includes mainly Festucae sulcata and Stipa tinctorum.

On this trip we are meandering on field roads somewhat east of the main road. We pass some low hills that seem to be outliers of hard, angular quartz. One might call part of it chert and I see some rosy quartz. In places the material is being blasted out for making gravel. But generally speaking, this area is covered with deep loess.

We look at first-year wheat after reclaiming the virgin Chestnut soil, which I believe will run two tons per hectare. (K-2622) Then I see them making hay from the virgin soil. They expect about 2.5 tons of this wild hay per hectare. I notice that they leave uncut strips to help hold the snow next year.

Now we are on the Unification Collective Farm. Last year they averaged 1.6 tons of wheat per hectare. This is a better year and they expect over 2 tons. Here, too, near the houses I see the manure bricks piled up for fuel. These villages look a bit bleak: what with the wind, cold, treelessness, mud, dust, terrible roads, and generally poor houses! Some of the new houses (K-2624) do not look too bad, nor do the people. (K-2658)

We stop in the virgin steppe and I get a surface sample of the dark Chestnut soil to a 4-inch depth. (K-2621) This is a very dark grayish-brown (10YR 3/2) silt loam with fine granular structure. The top half-inch is slightly platy. The surface is nearly level and there are few slight depressions with Solonchaks. I also take samples of the vegetation which includes mainly Festuca sulcata and Stipa tinctorum.

On this trip we are meandering on field roads somewhat east of the main road. We pass some low hills that seem to be outliers of hard, angular quartz. One might call part of it chert and I see some rosy quartz. In places the material is being blasted out for making gravel. But generally speaking, this area is covered with deep loess.

We look at first-year wheat after reclaiming the virgin Chestnut soil, which I believe will run two tons per hectare. (K-2622) Then I see them making hay from the virgin soil. They expect about 2.5 tons of this wild hay per hectare. I notice that they leave uncut strips to help hold the snow next year.

Now we are on the Unification Collective Farm. Last year they averaged 1.6 tons of wheat per hectare. This is a better year and they expect over 2 tons. Here, too, near the houses I see the manure bricks piled up for fuel. These villages look a bit bleak: what with the wind, cold, treelessness, mud, dust, terrible roads, and generally poor houses! Some of the new houses (K-2624) do not look too bad, nor do the people. (K-2628)



K-2622. August 14, 1958. North of Akmolinsk.
First year wheat on newly plowed dark
Chestnut soil.



K-2623. August 14, 1958. North of Akmolinsk. Making hay on
virgin dark Chestnut soil.

2622

XVI-6

K-2623. August 14, 1958. North of Akmoinsk.
First year wheat on newly plowed dark
Chestnut soil.

K-2623

XVI-6

K-2623. August 14, 1958. North of Akmoinsk. Making hay on
virgin dark Chestnut soil.



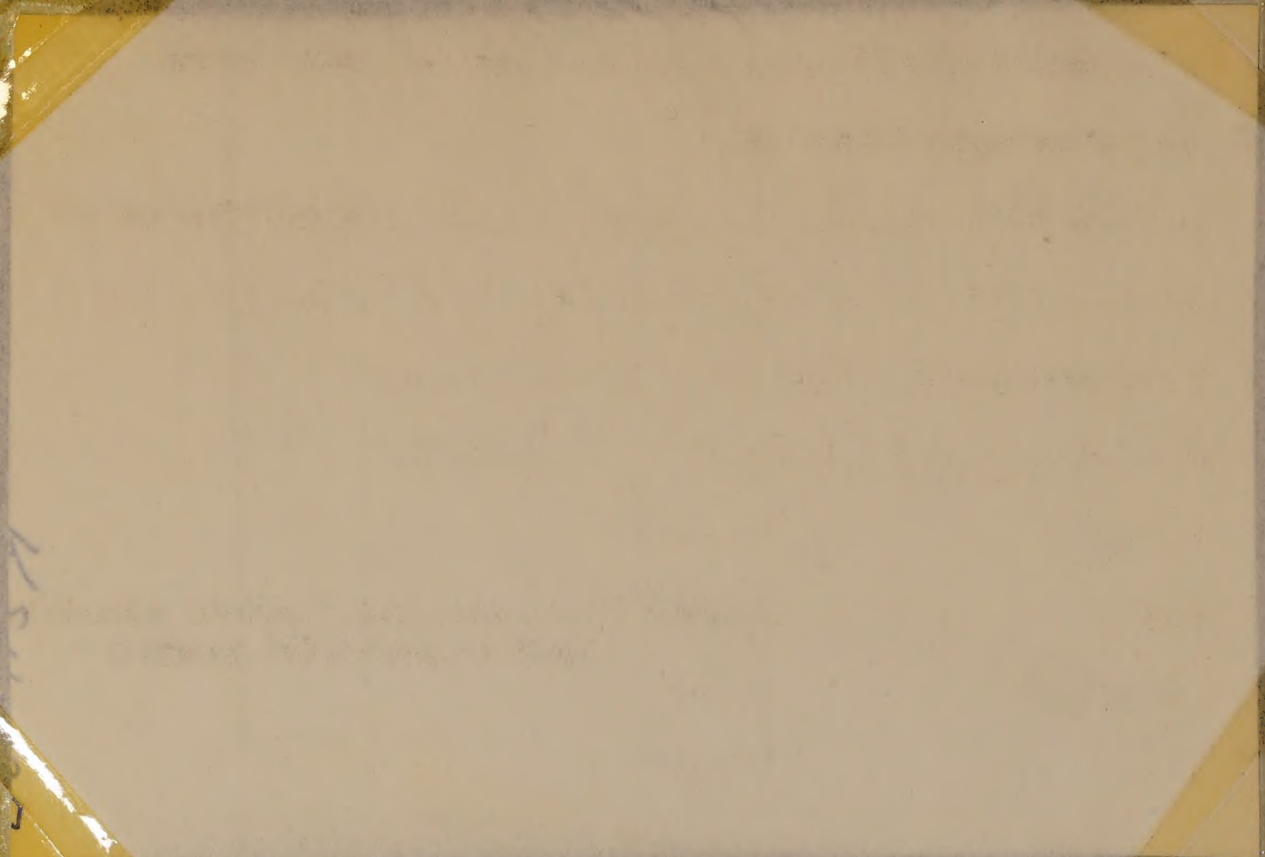
K-2624. August 14, 1958. North of Akmolinsk. New house on Unification Collective Farm.

S-171

K-2624. August 14, 1958. North of Almaty. New house on
Mikhailovskaya Collective Farm.



K-2658. August 14, 1958. 75 km. north of Akmolinsk.
Mother and children on Unification Collective
Farm.



K-260. August 19, 1951. 15 km. north of Khabarovsk.
Mother and children on station platform.
Farm.

I photograph a nice group of Red Steppe cattle grazing on the virgin soil.

We now reach the collective farm named the Eighteenth Anniversary of the Kazakhstan Republic, organized in 1933.

We stop at the temporary headquarters of brigade No. 1. This is a clean little building with many beds and several small rooms. It has nice new tree plantings around it.

We meet the chairman, Mr. Kandykhan. He is a Korean who has been here for several years and has been chairman since 1944. For his success he has been made a Hero of Socialist Labor.

He gives me the areas as follows, in hectares:

Total area	18,000	
Cropland	10,560	(This does not include plowable land in perennial grass.)
Soft wheat	8,560	
Barley	200	
Corn for silage	550	
Oats	320	
Corn as pasture	200	
Sunflowers for silage	100	(Yield is 27 tons per hectare)
Sunflowers for grain	100	
Potatoes	80	
Vegetables	15	
Seed flax	50	
Perennial grass	2,240	
Fallow	2,200	



K-2659. August 14, 1958. 75 km. north of Akmolinsk.
Cattle grazing on virgin dark Chestnut soil.
Red Steppe grades.

K-2659. August 14, 1958. 75 km. north of Akumal.
Cattle grazing on virgin dark Guatemalan soil.
Red Sedge grass.

He also gives the following figures for livestock:

Cattle	1,350, including 385 milk cows
Sheep	5,200
Hogs	1,285
Horses	383
Poultry	over 10,000

This year they bought 27 tractors of which 23 are crawlers; 20 combine harvesters of which 4 are self-propelled; and 23 wind-rowers. They spent 1,200,000 rubles for their machinery.

There are 220 families on the farm and 295 workers of which 170 are women.

Their gross income last year was 7,085,000 rubles. Last year each labor day paid 17 rubles, two kilograms of wheat, and 1/2 kilogram of potatoes and vegetables. They reckon a total value of 20 rubles.

The chairman says that all the good land on this farm has been reclaimed but they do plan to break up the natural pastures in order to establish improved ones. They expect to plow, sow a grain crop, and seed a permanent meadow.

Last year the cost of ridging snow on the fields was 5 rubles per hectare for each operation. This was done twice on 4,000 hectares and three times on 700 hectares planned for corn. He gives me the following as a rotation:

1. Fallow
2. Wheat
3. Wheat
4. Wheat seeded with grass

4. Wheat seeded with grass
3. Wheat
2. Wheat
1. Fallow

following as a rotation:

and three times on 700 hectares planned for corn. He gives me the hectare for each operation. This was done twice on 4,000 hectares last year the cost of ridging snow on the fields was 2 rubles per

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This year they bought 27 tractors of which 23 are crawlers;

Poultry	over 10,000
Horses	383
Hogs	1,282
Sheep	2,200
Cattle	1,350, including 382 milk cows

He also gives the following figures for livestock:

5. Perennial grass
6. Perennial grass
7. Perennial grass
8. Wheat
9. Row crops
10. Fodder crops

When wheat follows wheat, after harvesting they disk the soil in the fall and plow without moldboards to a depth of 20 centimeters.

In the spring the soil is harrowed twice across the plowing or on the diagonal. The soil is cultivated again if necessary to control weeds. Commonly, they roll just before or just after sowing. The seeds are treated with phospho-bacterin.

This year they expect about 1.7 tons to 1.8 tons per hectare of wheat. Last year they had 1.35 tons and the year before 1.2 tons per hectare. They try to have a stand of wheat that gives 380 plants per square meter. Last year the government paid 740 rubles per ton of wheat.

Last year they had a total of 220,000 labor days. Since more of the men are skilled and since they need a high proportion of skilled laborers, especially tractor drivers, the men on the average made 1,000 labor-day units and the women 486.

I see a new cow shed under construction for 200 cows. They have a building for calves in addition. There is a pigsty under construction for 1,200 hogs, a sheep fold for 1,000 animals, and poultry houses for 5,000 birds.

The hogs are fed barley, oats, sunflowers, potatoes, and alfalfa meal. In the summer they are pastured on alfalfa.

- 2. Perennial Grass
- 6. Perennial Grass
- 7. Perennial Grass
- 8. Wheat
- 9. Row crops
- 10. Fodder crops

When wheat follows wheat, after harvesting they disk the soil in the fall and plow without moldboards to a depth of 10 centimeters. In the spring the soil is harrowed twice across the plowing or on the diagonal. The soil is cultivated again if necessary to control weeds. Commonly, they roll just before or just after sowing. The seeds are treated with phospho-bacterin. This year they expect about 1.7 tons to 1.8 tons per hectare of wheat. Last year they had 1.35 tons and the year before 1.2 tons per hectare. They try to have a stand of wheat that gives 380 plants per square meter. Last year the government paid 740 rubles per ton of wheat. Last year they had a total of 320,000 labor days. Since more of the men are skilled and since they need a high proportion of skilled laborers, especially tractor drivers, the men on the average made 1,000 labor-day units and the women 480.

I see a new cow shed under construction for 200 cows. They have a building for calves in addition. There is a pigsty under construction for 1,200 hogs, a sheep fold for 1,000 animals, and poultry houses for 2,000 birds.

The hogs are fed barley, oats, sunflowers, potatoes, and alfalfa meal. In the summer they are pastured on alfalfa.

I am told that they have had some bad experiences with shelterbelts because of excess accumulation of snow in and around the belt. This means less snow in the next field and a delay of field work near the shelterbelt. Now they are suggesting shrubs instead of trees. (This sounds a bit fishy to me. Possibly it is the explanation for a failure.)

(I felt fine this morning but now at 3:25 p.m. with no tea or lunch, I am extremely tired.)

I go into a new 4-row cow shed equipped with tracks for manure and for feed. The milking is done with machines.

As we go on through another village I see a little cart with a wooden tank for hauling water. In other villages I see women carrying water in two pails hanging from a neck yoke.

As we drive along on this fairly undulating landscape, the depth of loess seems quite variable as well as the material under it. In places this underlying material is light gray and elsewhere it is red or yellow.

We pass Shortandy, a rayon center. The houses are small and the streets wide. These streets are either very dusty or very muddy. Some of the houses have little trees near them but most are rather miserable. It is a sad little town on the treeless steppe where life must be pretty hard.

We come to the Kazakh Scientific Research Institute on Grain-Crop Growing at 4:10 p.m. The soil here seems to be dark Chestnut, almost Chernozem. Water is had from a small river for some irrigation.

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Growing at 4:10 p.m. The soil here seems to be dark Chestnut, almost

Chernozem. Water is had from a small river for some irrigation.

We are taken to lunch, which lasts until 5:30. Here we have the usual toasts, etc. Then we go to the office of Director Baraev. He and his staff explain their program.

The Institute was founded in 1957 based on a small experimental station in order to serve this area of "virgin soils." They have a staff of 125 with 35 senior professional people and 45 juniors and technicians. They list their principal problems as follows:

1. Study of crop rotations.
2. Investigations of soil management.
3. Soil and water conservation.
4. Hazard of soil blowing studied in a special laboratory of agro-soil science.
5. Reclamation of Solonetz, in same laboratory as soil blowing.
6. Agro-forest amelioration. They study problems of planting to protect crops and soil against hot dry winds.
7. Agro-chemical and fertilizer laboratory. The soils here respond well to phosphorus, especially to small amounts with the seed. Phospho-bacterin gives response. As yet they have had no response to nitrogen.
8. Crop selection laboratory, especially for spring wheat, pulses, grasses, legumes, and oil-bearing crops.
9. Mechanization laboratory to test machines for soil tillage and to suggest changes in design.

We are taken to lunch, which lasts until 2:30. Then we have the usual routine, etc. Then we go to the office of Professor Barrett. He and his staff explain their program.

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3. Soil and water conservation.
4. Research of soil blowing studied in a special laboratory of agro-soil science.
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9. Mechanization laboratory to test machines for soil tillage and to suggest changes in design.

10. Fruit-growing laboratory. They look for new methods for growing fruits suited to local conditions, which are very difficult, especially because of the winter frost (about -40°C). Only Siberian apples can be grown, which are trained to trail on the ground; but they have some other fruit such as strawberries.
11. A section on potatoes. With new varieties the crop can be grown here without irrigation.
12. A section on animal husbandry is being organized.

The experimental farm has 13,000 hectares, of which 9,600 are under crop, especially spring wheat. They produce seeds of the good varieties for state and collective farms. Last year they grew 10,000 tons of pure seed wheat with yields of 1.6 tons per hectare.

They say they are giving particular attention now to soil management. I ask them about reclamation of the Solonetz (which in our nomenclature is mainly solonetzic Chestnut soil.) They tell about the same story as we had heard: an ordinary plow or disk plow is used to pulverize the A horizon. They do not recommend the reclamation of Solonetz that does not have a deep A horizon. Then they plow without moldboards and allow the soil to lie fallow for a short time.

They claim that the phospho-bacterin under experiment on farms increases yields of wheat from .15 to .20 tons per hectare. The best results are had after the first and second year following reclamation and while the organic matter is still high. But they say that one cannot "see" the difference.

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increases yields of wheat from .15 to .30 tons per hectare. The best

results are had after the first and second year following reclamation

and while the organic matter is still high. But they say that one

cannot "see" the difference.

(Added later: These trials were made by comparing very large fields and I am persuaded that the results are not statistically significant. Dr. Nelson brought some back to the United States for trial under rigidly controlled experiments in the field.)

For shelterbelts they now recommend a somewhat different scheme growing out of their experience. They suggest that probably the best way is to plant trees that will grow tall in two rows but without shrubs. The wide shelterbelts get piled with snow and the effects are reduced. The trees used are mainly poplar, birch, and Siberian larch.

They are now studying the possibility of combining the rows of high trees with the rows of shrubs. The plan is to have the windbreak of two rows three meters apart. The distance to the next trees would be 300 meters. At 40- or 50-meter distances between they would have shrub rows. The shrubs are yellow acacia or Caragana aboresence.

Many farms make snow ridges in winter about 20 to 25 meters apart, although 15 meters is better. Some make ridges in both directions.

In testing the effect of the snow ridges, they measure the water content of the soil in the winter and in the spring. (Obviously the differences cannot be related entirely to snow melt.) In their tests, with no ridges or other practices to catch the snow, they estimate 400 to 500 tons of water in a hectare of soil. In dry years the difference in yield is around 100 percent; in normal years 25 percent; and in very dry years 400 to 500 percent. But then they say that they have years when the soil is deeply frozen before there is much snow and the melt water runs off. With ridges, the water in the snow amounts to 750 to 800 tons.

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and I am persuaded that the results are not statistically significant.
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snow rows. The shrubs are yellow acacia or Caragana about 1 meter
Many farms make snow ridges in winter about 15 to 20 meters apart,
although 15 meters is better. Some make ridges in both directions.
In testing the effect of the snow ridges, they measure the water
content of the soil in the winter and in the spring. (Obviously the
difference cannot be related entirely to snow melt.) In their case,
with no ridges or other practices to catch the snow, they estimate
400 to 500 tons of water in a hectare of soil. In five years the
difference in yield is about 15 percent. In some years 15 percent
and in very dry years 400 to 500 percent. And then they say that they
have years when the soil is deeply frozen before the snow melts
and the melt water runs off. With ridges, the water in the snow accumulates
to 750 to 850 tons.

Some farms sow sunflowers in 2-row strips about 15 meters apart or, more commonly 20 or 25 meters apart. These are sown when the fallow is last tilled. They claim to have measured 1,100 to 1,200 tons of water in the snow on fields with sunflower strips.

They emphasize the great importance of keeping high stubble to catch snow.

The Director gives me photographs of the snow-ridging machine and of the sunflower strips. From the photograph it appears that sunflowers are also planted in the spring.

Even though it is very late we pile in the cars for a field trip over this enormous station. We are shown some weakly carbonated Chernozem that is said to be subject to soil blowing after cultivation. They recommend that such soils be maintained in grass, at least most of the time.

They tell me about their rotations but there are good opportunities for confusion because soil under perennial grass is not regarded as "cultivated" while it is under grass even though this is part of a rotation. As I get it, if we had 5 fields of about the same size the rotation would be something as follows:

1. Fallow
2. Spring wheat
3. Spring wheat
4. Spring wheat, barley, or oats

Some farms sow sunflowers in 3-row strips about 12 meters apart or, more commonly 20 or 25 meters apart. These are sown when the fallow is last tilled. They claim to have reaped 1,100 to 1,200 tons of water in the snow on fields with sunflower strips.

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2. Spring wheat
3. Spring wheat
4. Spring wheat, barley, or oats



Copy of photo given me at the institute near Shortandy,
showing a tractor-drawn snow-ridging machine.

Copy of photo given me at the institute near Shorlandy,
showing a tractor-drawn snow-riding machine.



Copy of photo given me at the institute near Shortandy,
illustrating strips of sunflowers for holding snow on the fields.

After 4 of these cycles the field comes under a mixture of crested wheatgrass and alfalfa. These are allowed to grow for 4 years. Thus we would have a 20-year rotation with 4 fields in crop and 1 field in grass.

On the carbonated Chernozem that is subject to blowing they recommend plowing, with moldboards, only the virgin soil or after several years in grass. At any other time they recommend shallow disking one year, then plowing without moldboards, then disking, and then plowing without moldboards. We see some soils here that are only weakly carbonated if at all and seem to me to be silty clay loams transitional between Chestnut and Chernozem. I see some nice wheat after shallow disking that has followed wheat that was sown after shallow plowing without moldboards. I estimate 26 bushels to the acre (or about 1.7 tons per hectare) of hard red spring wheat. (K-2625) They tell me that this gets a premium of 40 percent above the regular price.

They tell me that they go over the land with machines 7 times to produce a crop of wheat. They say they get 100 kilograms of wheat for each 0.88 man-days. But I don't know how they calculate these figures for they certainly do not include all the labor as these farms are organized and staffed.

We continue to drive around these big wheat fields on rough and dusty roads to be shown their various combinations of rotation and tillage. I look at a nice field of hard white wheat (Akmolinka 5) following virgin fallow. This may yield nearly 3 tons per hectare.

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 created wheatgrass and alfalfa. These are allowed to grow for
 4 years. Thus we would have a 20-year rotation with 4 fields in
 crop and 1 field in grass.

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 loams transitional between Chestnut and Chernozem. I see some nice
 wheat after shallow disking that has followed wheat that was sown
 after shallow plowing without moldboards. I estimate 25 bushels to
 the acre (or about 1.7 tons per hectare) of hard red spring wheat.
 (K-1625) They tell me that this gets a premium of 40 percent above
 the regular price.

They tell me that they go over the land with machines 7 times
 to produce a crop of wheat. They say they get 100 kilograms of wheat
 for each 0.88 man-days. But I don't know how they calculate these
 figures for they certainly do not include all the labor as these farms
 are organized and staffed.

We continue to drive around these big wheat fields on rough and
 dusty roads to be shown their various combinations of rotation and
 tillage. I look at a nice field of hard white wheat (Anmolinka 2)
 following virgin fallow. This may yield nearly 3 tons per hectare.



K-2625. August 14, 1958. Near Shortandy. Wheat on
Institute farm. Probably about 26 bushels
per acre or 1.7 tons per hectare. Chernozem.
(Dr. Cline).

K-2625

1-111X

K-2625. August 14, 1956. Near Shortland. Wheat on
Institute farm. Probably about 20 bushels
per acre or 1.7 tons per hectare. Chernozem.
(Dr. Cline).

Now I'm told that they have brought under the plow 23,000,000 hectares of virgin soils in this Republic and plan to take up another 5,000,000 hectares. These new soils may not average quite so productive as the earlier ones.

Just about dark we are shown a virgin Chernozem profile. I plan to see this in the morning.

On the long drive back they talk some more about their experiments with ordinary plowing, plowing without moldboards, shallow plowing, and other ways to conserve the stubble. Normally they use moldboard plows for sod fields but they also use them to turn down deeply the larvae of some grain pests that normally live at 5 centimeters.

Since late May and early June are dry, they try to sow late in order that the crop can make the best use of the rain. Plants from early sowing fail to have secondary roots. They must sow by May 25, however, to avoid the danger of September frost. This narrows the sowing period to between May 10 and May 25. Normally they harvest by September 1 and not later than September 10.

I should say that the growing situation here resembles that of central Saskatchewan.

They tell me they have had good results with herbicides at the stage of tillering. But these are in short supply.

The average collective farm in this area has 13,000 hectares under crop. One state farm sows 75,000 hectares. The average state farm has 28,000 hectares under crop. They tell me that the big state farm produces 100 kilograms of grain with .6 man-days. (Again I very much doubt this figure.)

We are finally at the camp for sleeping, here near the Institute, at 8:45. I have a little bread, cheese, and tea; wash; and go to bed.

This is the end of an extremely difficult day. Partly our hosts are really hospitable and partly they are totally indifferent to our physical welfare. The Director of the Institute here is more human and is a much better agriculturist than the old boy in charge for the agricultural administration for the Oblast.

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August 15

Unhappily, I awaken about 5:30. I make myself a glass of milk and rest until 6:15. The maid brings me boiling water for tea and strawberry jam. So I make out quite well, along with the bread and cheese I stored last night.

At 7:00 a.m. Dr. Cline and I are ready to go and look at the Chernozem. Most others, including our interpreter, are asleep. This trip will strain my Russian a great deal. Just as we leave Eddie rushes out in his robe, but I tell him to stay.

We go out about 15 miles into a virgin area of weakly carbonated ordinary Chernozem. (K-2627) This is about 85 kilometers north of northwest of Almolinsk.

The light is too poor to take pictures with the early morning sun at a right angle to the trench. (All soil colors are moist.)

- | | | |
|-----------------|---------|---|
| A ₁₁ | 0 - 1" | Very dark brown (10YR 2/2) silty clay loam held by roots of small bunchy grass (<u>Festuca sulcata?</u>). Strong, very fine granular; mulch-like surface. |
| A ₁₂ | 1 - 10" | This horizon has a clear, irregular, wavy lower boundary, as shallow as 6 inches and as deep as 20 inches. Very dark brown (10YR 2/2) silty clay loam. Moderately prismatic that falls into mixed friable small and medium subangular blocky and coarse granular. |

August 12

Monopoly, I washed about 2:30. I made myself a glass of milk and rest until 6:15. The maid brings me boiling water for tea and strawberry jam. So I make out quite well, along with the bread and cheese I scored last night.

At 7:00 a.m. Dr. Cline and I are ready to go and look at the Chertones. These others, including our interpreter, are asleep. This trip will strain my Russian a great deal. Just as we leave Eddis traces out in his robe, but I call him to stay. We go out about 15 miles into a virgin area of weakly carbonated ordinary Chertones. (K-2627) This is about 85 kilometers north of northwest of Amolinsk.

The light is too poor to take pictures with the early morning sun at a right angle to the trench. (All soil colors are white.)

- | | | |
|---|---------|-----|
| Very dark brown (10YR 2/2) silty clay loam held by roots of small bushy grass (<i>Poa</i> sp.) Strong, very fine granular; much like surface. | 0 - 1" | A11 |
| This horizon has a clear, irregular, wavy lower boundary, as shallow as 6 inches and as deep as 20 inches. Very dark brown (10YR 2/2) silty clay loam. Moderately prismatic that falls into mixed (friable small) and medium subangular blocky and coarse granular. | 1 - 18" | A12 |



K-2627. August 15, 1958. Near Shortandy. Virgin Chernozem landscape. (Dr. Cline, left.)

K-2627. August 25, 1958. Near Shostandv. Virgin Chernozem
landscape. (Dr. Cline, left.)

- B₂ 10 - 24" Very dark grayish-brown (10YR 3.5/2 heavy silt loam; the ped coats are (10YR 3/2). Medium to strong prismatic that falls into friable subangular blocky and angular blocky. Slightly firm; many fine roots; some roots are pressed against the ped surfaces; some peds have organic coats; irregular lower boundary, as little as 19 inches and as much as 30, within 4 to 6 inches laterally.
- B₃ 24 - 42" Brown (7.5YR 5/4) silty clay with very weak medium prismatic structure that falls into fairly friable weak blocky; firm; slightly plastic; clear wavy boundary.
- C_{cs} 42 - 51" Brown (7.5YR 5/4) silty clay loam. Small "eyes" of gypsum are white (10YR 8/2). Massive but digs out in easily friable clods; clear wavy boundary.
- C 51 - 85"+ Brown (7.5YR 5/4) silty clay loam. Massive and friable, with a few accretions of gypsum.

The soil is calcareous throughout. I suspect that this mild carbonate was introduced by recent loess after the soil was fairly well developed. There are krotovinas throughout and especially in the B₃.

The area is nearly level. Marmot mounds are about 30 feet in diameter and 20 to 30 inches high. I estimate about 2 of these per acre. Grass covers 60 percent of the surface. I take a sample 4" x 4" x 4" at the surface.

This is indeed a beautiful soil especially for wheat. With moderate care there should be no great hazard of soil blowing.

As we drive back toward the Institute I see men mowing and raking wild hay with tractors pulling very wide tools. We make a hurried stop to look at another soil much like the one already described, but with a bit thinner A horizon.

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to look at another soil much like the one already described, but with wild hay with tractors pulling very wide tools. We make a hurried stop As we drive back toward the Institute I see men mowing and raking care there should be no great hazard of soil blowing.

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We are back at the Institute, have breakfast about 9:15. The others will look at some of the plots near the headquarters while we finish. I am beginning to feel a little ill; I think wholly from fatigue.

Since we are supposed to visit a state farm at a long distance from the Institute I press the group to get started and we leave at 10:00 a.m. over bad roads.

This is called the Shortandinski State Farm, from the name of local fish. The farm has a total area of 50,614 hectares of which 39,722 are plowed, and 35,864 are under crops. The farm was established only three years ago on virgin soil.

Since we have 80 kilometers to go and must return by the same route, I try to get the statistics about it on the way.

They give me the following figures, in hectares, on their crops:

Wheat	33,775
Barley	262
Oats	501
Millet	395
Sunflowers for seed	120
Sunflowers for silage	225
Corn for silage	626
Potatoes	80
Irrigated vegetables	10
Peas	10
Perennial grass	3,093

They have no shelterbelts yet, but these are in the plan.

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They give me the following figures, in hectares, on their crops:

Wheat	33,773
Barley	262
Oats	501
Miller	392
Sunflowers for seed	120
Sunflowers for silage	225
Corn for silage	626
Potatoes	80
Irregular vegetables	10
Peas	10
Perennial grass	3,093

They have no shelterbelts yet, but these are in the plan.

The livestock is said to be as follows:

Cattle	1,380, of which 294 are milk cows
Sheep	1,500
Hogs	814, of which 60 are sows and 120 are one-litter sows
Poultry	600
Horses	110
Bullocks	14

The main machinery items are as follows:

Tractors, crawlers, DT-54	98
Tractors, crawlers, S-80	10
Tractors, tire	12
Combine harvesters, tractor drawn	103
Combine harvester, self- propelled	8
Windrowers, tractor drawn	36
Windrowers, tractor mounted	6
Trucks	44
Cars	2
Snow ridgers	17

Of course they have many other machines to go with this equipment.

Milking is done by hand.

They have 4 storage houses for grain that hold 2,500 tons apiece.

There are 294 families on this farm and 496 workers of which they say about 70 percent are men. They also use 300 seasonal workers during harvest. These are said to be mainly students and young factory workers among the Comsomols. All the work is piece work so they have no figures

The livestock is said to be as follows:

Cattle	1,380, of which 294 are milk cows
Sheep	1,200
Hogs	814, of which 60 are sows and 150 are one-litter sows
Poultry	600
Horses	110
Bullocks	14

The main machinery items are as follows:

Tractors, crawler, DT-54	98
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for labor days. In 1957 they paid out 6,426,000 rubles for labor. Their gross income was 10,482,000 rubles. Because of better weather this season and higher yields they expect a gross income of around 25,000,000 rubles.

During the last 3 years yields of wheat have averaged .92 ton per hectare. This year they expect 1.5 tons per hectare. The government buys the wheat for 680 rubles per ton. They expect to deliver to the government 40,000 tons of wheat, which will give them a bonus. Next year they will grow wheat on another 3,000 hectares being broken out this year. (What a terrible road!!!)

Every 5 or 6 years they have one year of fallow to control weeds and, the agronomist says, to improve soil structure. Beginning next year, their plan calls for having the fields under grass for periods of 4 years to be followed by a 6-year crop rotation or a 10-year crop rotation.

The main grasses are couch grass and sanfoin but they will have alfalfa and crested wheatgrass. Although this will not greatly increase the percentage of land under grass, they expect to increase the quality and production of grass and thus increase their livestock, especially for milk and butter. It is hard for me to believe that they would not be better off with some beef cattle and good dairy cattle rather than this local white-faced Kazakh breed. They market their cattle at 1 year and 8 months and live weights are about 300 to 325 kilograms, I take it for the better ones.

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There are some small farms and some larger ones. The small ones have no horses.

As we drive along this earth road in the nearly flat treeless steppe, the land seems limitless. Near a small village by a livestock barn we pass a small pond where people are making fuel bricks out of manure and a bit of straw.

The agronomist tells me that they use artificial insemination for sheep, but not for cattle. Last year they sold 9,500 tons of milk to the government, which, as usual, was 70 percent of their production. Besides, most families have a cow, pigs, and poultry,

We pass a thermal power station built over a local coal mine said to be 180 feet deep.

As I look ahead near the little town of Zholymbet, I see a large heap of earth that appears to be mine tailings. I am told that it is a gold mine. (Added later: I discover a little later that we do a lot of extra driving around this farm to avoid being taken near this "gold mine.")

We arrive at the state farm about 11:08 and meet the manager, Mr. Kirilov, and part of his staff. This farm has two villages. The one here appears rather bleak in a bleak undulating steppe.

We drive out on the farm. Along the bottom of the drainageways hard rock is exposed that looks to be metamorphic. We drive over a large area of undulating to rolling steppe with some outcroppings of unidentified rock at the top of the low hills.

I am told this is dark Chestnut soil with Solonetz. (They say they have a soil map, but I do not see it.) There are considerable numbers of small swales that are now wettish.

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We stop and look at freshly plowed virgin Chestnut soil.

(K-2628; K-2629) Soon after plowing they go over it with a heavy disk harrow. This is followed by zigzag spike harrows and then heavy rollers. In this condition it goes over the winter. During the winter snow ridges are made. In the spring the field will be harrowed twice across the furrows. Where necessary for a good seedbed, they disk again and then sow the seed. On this field they say they can expect 2.1 tons to 2.2 tons per hectare. After 6 or 7 years it will go back to grass again.

I look at fourth-year wheat that is already getting a bit weedy. (K-2630) In parts of this farm there is quite a lot of wasteland from these swales, many of which have pools of water now. These are about 1/4 acre to 2 1/2 acres. Besides, there are spots of Solonetz. We are shown another field plowed in 1954 without moldboards. (In my picture (K-2631) here the "gold mine" shows dimly in the far right.)

This farm does not look prosperous to me judging from the villages. Most of the houses are double but in poor repair or appearance. One wonders whether the permanent workers are very well paid.

Our host drives us on these dusty roads in a circuitous route to keep us from seeing this so-called "gold mine." We leave at 1 p.m. This visit was hardly worth the candle. This fellow Strukov, head of the agricultural administration of the Oblast, strikes me as a rather stupid Party hack who could not care less about our welfare or about agricultural science. He seems to be a kind of Russian Captain Bligh.

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or about agricultural science. He seems to be a kind of Russian
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K-2628. August 15, 1958. N. E. of Shortandy. Shortandsinski State Farm. Fresh plowing of virgin dark Chestnut soil.



K-2629. August 15, 1958. N. E. Of Shortandy. Shortandsinski State Farm. Fresh plowing of virgin dark Chestnut soil. Close view.

K-2628. August 15, 1958. N. E. of Shortlandy. Shortlandski State
Farm. Fresh plowing of virgin dark Chestnut soil.

K-2629. August 15, 1958. N. E. of Shortlandy. Shortlandski State
Farm. Fresh plowing of virgin dark Chestnut soil. Close
view.



K-2630. August 15, 1958. N. E. of Shortandy.
Shortandsinski State Farm. Fourth year
wheat, already a bit weedy. (Dr. Nelson).



K-2631. August 15, 1958. N. E. of Shortandy.
Shortandsinski State Farm. Wheat on dark
Chestnut soil broken out in 1954 and plowed
last year without moldboards.

1-2630

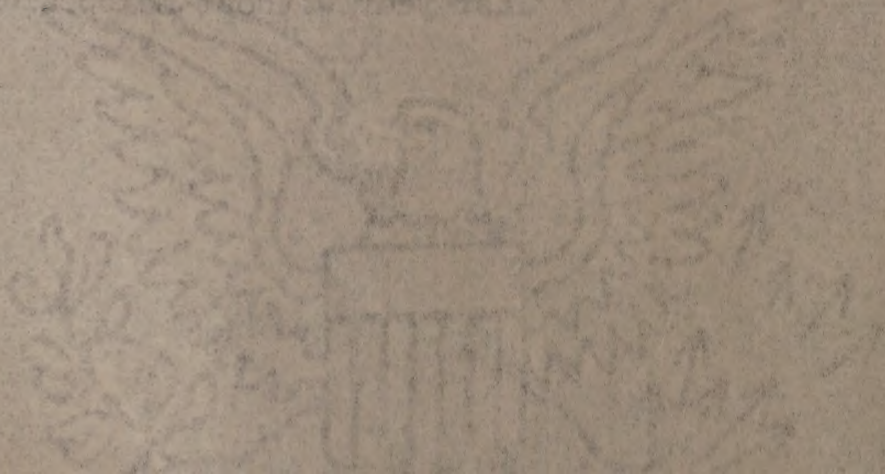
XVII-6

K-2630
The following is a list of the names of the persons who were present at the meeting held on the 1st day of January, 1900, at the residence of Mr. Nelson.

1-2631

XVII-7

K-2631
The following is a list of the names of the persons who were present at the meeting held on the 1st day of January, 1900, at the residence of Mr. Nelson.





K-2632. August 15, 1958. N. E. Of Shortandy. Wheat
on recently plowed dark Chestnut soil.
(Good crop).

K-2632

8 IXX

K-2632. August 15, 1958. N. E. of Shortland. Wheat
on recently plowed dark Chestnut soil.
(Good crop).

I stop to take some pictures of wheat on the way back. (K-2632)

We see a few groves of natural birch and pine on the north-facing slopes.

We return to the Institute at 2:15 and have lunch. I then look hurriedly at the apples that trail on the ground. (K-2633 and K-2634) These are trained to trail and not a special variety that grows naturally that way. I am told the low apples are protected by the snow alone. I see some upright trees of the same variety that must be hardy although they are protected by deciduous shelterbelts.

At 3:45 we start for the original camp of "Rest and Culture" near Akmolinsk.

It is obvious that our hosts are avoiding the main road for some reason since we are taken on an ungraded, rough, dusty, prairie road. It is simply a complex of old field roads. About 10 miles out of, and somewhat to the west of the main road, I see the top of a tower to the east. This may well be the top of an oil derrick near the main road. Yet we continue on this terrible prairie road which seems to go roughly parallel to the main road and railroad to the northeast of us.

I see wild hay being made with a regular mower pulled by horses. It is raked up with one-horse dump rakes and is put into small stacks by hand. I am sure these kinds of practices and this labor are not counted in the figures they have given me to indicate high efficiency.

I stop to catch some specimens of insects on the way back. (2-25-55)

We see a few groves of natural birch and pine on the mountainside.

stopped.

We return to the insectary at 1:15 and have lunch. I then

look hurriedly at the species that were taken on the ground. (2-25-55) and

2-25-55) These are taken to the bank and a quick survey of them

is made. I am told that the species are protected by

the snow alone. I see some slight traces of the same variety that

must be fairly common though they are protected by the snow and the

At 3:45 we start for the original camp of the old and

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It is clearly a complex of old field roads. About 10 miles out of

and somewhat to the west of the main road, I see the top of a low

to the east. This may well be the top of an old hillside near the

main road. Yet we continue on this terrible gravel road which seems

to go roughly parallel to the main road and is almost entirely

of us.

I see wild hay being made with a regular motion pulled by horses.

It is packed up with one horse and is an interesting sight.

By 6:00, I am sure these hills of mountains and this spot are

counted in the figures that have given me to indicate high mountains.



K-2633. August 15, 1958. Shortandy. Apples trained near the ground to have snow protection.



K-2634. August 15, 1958. Shortandy. Apples trained near the ground to have snow protection.

1 - XVIII

K-2633. August 15, 1958. Shorlandy. Apples trained near the ground to have snow protection.

2 - XVIII

K-2634. August 15, 1958. Shorlandy. Apples trained near the ground to have snow protection.

Out about 20 miles I see the top of another derrick far to my right - to the west. And in another 2 miles I see a third one on my left, to the east.

In places the soil has a reddish color suggesting scoria in the parent material where the loess is thin. This may be an area with both coal and oil and the scoria may have resulted from very ancient natural burning of coal near the surface, as in the western part of North Dakota.

I am getting very much put out by being led all around something on these terrible field roads. We meet only the odd farm truck and see very few small villages.

Out about 25 miles I see a big column of smoke to the east about where the main road should be.

We pass a small village, probably a brigade headquarters, where houses are being made of brick that appear to be a mixture of cow manure, mud, and straw. These bricks are about 3 times the normal size.

At 5:03 we cross the railroad on a large flat area that suggests a lake plain and are then taken back to the main road at the location of a fairly good-looking collective farm. Now we can move along on this good road. The soils look to me to be Brown soils with some Solonetz.

After having wasted more than an hour on these hide-and-seek, winding, dusty prairie roads, we come to the edge of Akmolinsk at 5:35.

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After having wasted more than an hour on these hide-and-seek winding, dusty prairie roads, we come to the edge of Akmalinsk at 5:35.



K-2660. August 15, 1958. Akmolinsk. Old-style wooden house.

K-2660. August 15, 1958. Almodovar. Old-style wooden house.

At the edge of the city I see many little low houses with roofs of soil and straw. I stop long enough to photograph one of the old-type wooden houses with carvings on it. (K-2660)

(I seem to smell oil again; and this reminds me that when we got back to the main road the traffic was fairly heavy with trucks carrying non-agricultural machinery.)

We get back to camp at 6:11 p.m. Everyone is very tired and dirty. Mr. Melnikov is well, but not from vodka and salt. I clean up, change my clothes and pack. I am told that dinner will be at 10 p.m. and that we go to the plane at midnight.

I lay down on the cot to rest and doze off for a bit. Now this fatigue has really got me, so I don't go to the dinner. At 11:45 I get up and go to the dining room for a few minutes. Now I am told the plane is very late. So I return to my cot. And thus one day passes into another.

August 16

Finally, the singing in the dining room stops about 2 a.m. Now that the damage has been done "Captain Bligh" is very friendly and tells the car driver to go slowly because of my stomach pains. We go over the same rough road and reach the airport at 2:45. No one seems to know when the late plane will actually come. I notice a lot of men here in very dirty, unpressed suits that watch us all the time both from the inside and outside of the little station. I am really miserable.

At 3:20 a.m. the wheels are up for Moscow where it is now 12:20 a.m.

The wheels are down again at Kustanay at 5:20. The boys in the blue serge suits come in to inspect the plane. I don't know why. The wheels are up at 6 a.m. and down again at Chelyabinsk at 7 a.m.

We are ushered into a small room where a physician comes to look me over. She recommends activated charcoal, which I have been taking; but she suggests a heavier dose.

Now we find we have a 5-hour stopover here! We are given rooms in the airport hotel. I rest, but sleep very little. Some of the pain leaves but a part of it only goes into my head.

We have breakfast about 11 a.m., and then the wheels are up at 8:37 Moscow time.

The landscape here seems to be a complex forest-steppe.

Oh, what long and painful hours!!

August 16

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a lot of men here in very dirty, unpressed suits that watch us all
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At 3:50 a.m. the wheels are up for Moscow where it is now

12:30 a.m.

The wheels are down again at Kustanay at 5:50. The boys in the
blue serge suits come in to inspect the plane. I don't know why.
The wheels are up at 6 a.m. and down again at Chaybansk at 7 a.m.
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We have breakfast about 11 a.m., and then the wheels are up at

8:37 Moscow time.

The landscape here seems to be a complex forest-steppe.

Oh, what long and painful hours!!

The wheels are down in Kazan at 11:38 and up again for Moscow at 12:11 p.m.

These are such great distances between stops. What an ordeal this day has become. In 27 hours I suppose I have had a total of two hour's sleep, in little cat naps.

The wheels are down in Moscow at 2:56 p.m. We get away from the airport at 3:25 and go to the Moskva Hotel. After Akmolinsk the plumbing in the Moskva Hotel seems wonderful indeed.

We have dinner from 5:30 to 7 and I prepare for bed. I am still extremely tired. The stomach pains have eased. What a day! But one begins to realize the enormous vastness of this great country.

It seems to me now that I met few people the last few days who are really clean and really happy. Perhaps some of the young people are.

Most men above the rank of common laborer, and even many of these, wear suits on jobs for which people would wear slacks and jackets in other countries. Generally, the suits are about one or two sizes too large. Commonly, just the tips of the fingers extend out of the sleeves. Many of these suits are very much in need of cleaning and pressing. On the whole, the dress of the women is much better.

Of what I have seen of the "new lands" I can say that the soils are better, the crops better, and the science poorer than I had expected. The leaders are especially weak on the application of civil engineering as applied to agriculture, including farm roads. These earth roads are so dusty and muddy that they soon become lower than the adjoining land.

The wheels are down in Kazan at 11:38 and up again for Moscow

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as applied to agriculture, including farm roads. These earth roads

are so dusty and muddy that they soon become lower than the adjoining land.

And the mud continues to get worse. They must result in much damage to the farm trucks and high costs for transport.

And so to bed!

August 17

I feel very much better this morning. After breakfast we visit some of the bookstores where I buy some books to take home, mainly Russian classics in English. I do a little walking for pictures and make a few purchases in the Gum department store near the Red Square.

I have a conference with the delegation in order to get their ideas on what sort of things might be best to highlight in my discussions tomorrow at the Ministry.

I prepare some summaries and am early to bed.

And the mud continues to get worse. They must repair in such
 damage to the farm trucks and high costs for transport.

And so to bed!

August 17

I feel very much better this morning. After breakfast we visit
 some of the bookstores where I buy some books to take home, mainly
 Russian classics in English. I do a little walking for pictures
 and make a few purchases in the Gum department store near the Red
 Square.

I have a conference with the delegation in order to get their
 ideas on what sort of things might be best to highlight in my dis-
 cussions tomorrow at the Ministry.

I prepare some summaries and am early to bed.

August 18

Unhappily I didn't sleep well last night. Yesterday morning I easily got the hot water for tea but this morning it is difficult; but finally I overthrow the counter-revolution.

I have tea and then breakfast.

Bulik goes to the Embassy to take my soil samples and bring back the movies. He and Dr. Allaway were in such a hurry that they forgot the soil samples so I will have to go later.

Later in the morning we go to the Tretyakov Art Gallery. This is an all-Russian collection that was gathered together by a wealthy merchant. He gave the collection and his palace for housing it to the city of Moscow in 1892. It has been added to since then. It is one of the nicest galleries I have ever seen. We were fortunate to have an excellent guide, a lady who has spent many years as an art critic. I was especially interested in seeing the Russian phase of Impressionism. I buy a few reproductions. By far the nicest is Girl with peaches by V. Serov. (1887).

We go from the art gallery to our final conference in the Ministry of Agriculture. There are many people from the Ministry with Mr. Gennadi A. Barkov, Vice-Minister of Agriculture and in charge of the inspection of fertilizers, in the chair. Many others are present, including Professor Tyurin of the Academy.

Outline of Final Conference in Moscow

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Outline of Final Conference in Moscow

I open the discussion with sincere thanks to the Ministry for the excellent arrangements and especially for sending such an obviously

well-qualified agricultural expert with us as Mr. Vasily Mikhailovich Melnikov and such an excellent interpreter as Mr. Edward Baranov.

We speak briefly of the excellent farms and water development near Andizhan; the high potentialities of the virgin lands near Almolinsk; and the several excellent institutes with special reference to the institute for rice culture at Krasnodar and the institute for corn growing at Dnepropetrovsk.

The Vice-Minister asks me to speak very frankly of any criticisms or suggestions we might have. I discuss several suggestions as follows:

(1) Soil damage by water erosion is not so serious generally as in the United States, primarily because of differences in the character of the rainstorms, still there are important areas in the USSR where the erosion problem is becoming quite serious. In places where the streams are deeply trenched, gullies are working back into good soils. It is nearly always much easier and much less costly to prevent such erosion than it is to reclaim the eroded soils once the damage has been done. In most countries having advanced programs for erosion control, engineering methods are used to supplement erosion-resisting vegetation for control. We have seen many places in the USSR where diversion terraces and masonry chutes to the main drainage would be very helpful. Such works are needed along with the protective trees, shrubs, and grass.

(2) More specific experimental design to measure moderate differences in the effects of practices would be very helpful. Good

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experimental design includes replications and randomization of plots in order to have adequate statistical treatment of the data. We feel that with good experimental design and well-carried out experiments several problems that are now subject to question and controversy could be clearly settled. Then too, adequate experimental design not only permits greater accuracy but also allows useful study of the interactions among several practices and weather conditions for the kinds of soil that are investigated.

(3) We saw considerable nitrogen deficiency on corn, potatoes, and other crops during our visit. We realize that part of this may result from the more-than-average rainfall of this year. We also recognize that more fertilizer plants are planned or are under construction to meet these needs. Then too, as the nitrogen and phosphorus levels in the soil are raised, deficiencies of potassium and the trace elements may be more apparent. We noted some examples of these also.

(4) More accurate and convenient methods for measuring the need of water in soils by plants are available than are being used in the USSR. Such instruments, including the tensiometer, are based on the concept of the energy required by the plant to extract the water from the soil. These newer energy concepts make possible a much wider use of experimental results. It is easy for field workers to read the tensiometers.

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(5) At Dnepropetrovsk the land-leveling machines that were demonstrated seemed to us a little small for best results. Nor was the field as carefully staked out for cuts and fills as many would do.

(6) The experimental drainage machines at Minsk seemed to us larger, heavier, and more costly than necessary for the work to be done.

(7) In several places, the drain lines seemed to us to be very much too far apart for adequate results. One example is the drainage system used in the "Hungry Steppe" near Tashkent. Here we believe that considerable additional drainage may be needed to prevent serious problems of salinity.

(8) Around Minsk it seemed to us that some of the peat soils are being over-drained, especially where drains are far apart. Where overdrained such soils subside a great deal, usually unevenly, and after a few years of cultivation, the surface soils are subject to blowing.

(9) Generally in the world, agriculturists are trying to reduce tillage as much as possible in order (a) to avoid costly operations and (b) to preserve soil structure. One useful way to reduce tillage is the use of herbicides. I explained recent developments in New York and Illinois for growing corn with only 2 to 3 operations, including harvest. We feel that weeds are a serious problem in many parts of the USSR and that herbicides could be used to great advantage.

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(10) After looking at many farms, it seems to us that the emphasis in agricultural training may be relatively too great on the big machines and too little on small machines and hand tools for the simpler tasks. Many of these necessary small tasks could be done far more efficiently. The taking of manure to the fields and spreading it is one example. Another is the fact that water for irrigation is well handled and measured to the farm; yet relatively poorer methods are used for handling the water within the farm.

(11) I tell the Vice-Minister that on the basis of what we have seen, it seems to us that potentialities are adequate for supplying all the meat, milk, butter, and other food products that the Soviet population requires.

(12) I say that I hope these current exchanges can be followed through by two additional arrangements:

- i. An exchange of agricultural attaches, free to travel to any and all agricultural institutes; and

- ii. A broadening of arrangements for student exchanges to include leading agricultural colleges in both countries.

He tells me that he agrees heartily with both suggestions.

I turn over two of our departmental movies - From the Ground up and Waters of Coweeta - that I had brought from the United States.

(Added later: I am told that members of the Ministry and of the Academy like these films very much and that "suitable" ones will be located and sent to me in return.)

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be located and sent to me in return.)

We also ask for samples of their phospho-bacterin and of azotogen, so widely used in the USSR, to take to the United States for testing under our conditions. Both are promised. (Added later: But we receive only the phospho-bacterin in time to take it with us.)

The meeting seems to go very well indeed. The Ministry staff are very cordial and pleasant.

Then we are back to the hotel where I give a luncheon to the American delegation along with Eddie and Mr. Melnikov.

In the evening we are taken to the circus in the Gorki Park for Culture and Rest. I suppose it is fairly good although I am not keen on these acrobatic acts. Most of the acrobats are from East Germany. One of the young women has a bad fall from a considerable height.

We return to the hotel and I am to bed at 11:15.

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K-2637. August 19, 1958. Moscow. A view from my hotel window.



K-2639. August 19, 1958. View of the Kremlin from my hotel window.

7542-37

XVIII - 5

K-2637. August 19, 1958. Moscow. A view from my hotel window.

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XVIII - 8

K-2639. August 19, 1958. View of the Kremlin from my hotel window.

August 19

I am up at 7 a.m. Everyone seems to be in good spirits. Mr. Melnikov tells me that the Vice-Minister and his staff and the soil scientists from the Academy like the films very much. As soon as they can find something appropriate they will forward them to me. (I had explained that I should very much like to have a film on shelterbelts. It wouldn't surprise me any should I learn that they make a special film in color to send to us.)

At 10:00 a.m. we were to meet with the Intourist people and settle our final accounts. We wait and wait. Melnikov calls many officials in the government and they finally agree to come at 12:00 noon.

I hurry out with Eddie for a little shopping and buy some records and tea. When I return to the hotel the arguments with the Intourist are going forward.

I have lunch with E. (Jeannie) S. Savinova, who was my guide and interpreter during my visit to the Soviet Union in 1945. She looks well and I think reasonably happy. She is working as a teacher of English to graduate students in the Academy of Sciences of the USSR.

After lunch I go to the American Embassy and prepare the usual courtesy letters to the Ministry and special letters about Mr. Melnikov and Eddie Baranov and arrange about returning soil samples by air and sending our books by sea pouch.

Bulik stays at the Embassy and I return to the hotel. This business with Intourist is a mess. They overcharged us 4 full days apiece and say now it is too late in the day to get refunds from the bank!!! Then too, they refuse to take all of our extra meal coupons. But Melnikov does a real job with them and he gets the hotel manager here to give me back my money that I paid for the luncheon and take coupons. Then he calls somebody who insists that Intourist take our coupons for the big car bill that we have here in Moscow. Intourist gives each of us a slip that is supposed to be honored by American Express to give each of us \$60 for the 4 unused days. If I see half of that by next Easter I'll be satisfied. We have a real scramble then among ourselves to pay what we owe one another, to pay our bills, and to have just the right amount of rubles for tonight.

About 6:30 I have dinner with Savinova while the others have a huge and expensive banquet to use up the food coupons.

After a little walk to Pushkin Place, I am early to bed.

This has been about the worst day with all its silly waiting and discussions to settle what could have been done in thirty minutes.

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August 20

I am up at 4:30. There is gentle rain. The counter-revolution has failed completely; the maid brings me tea at this hour! We leave for the airport at 5:15 a.m.

Our Russian friends come with us and get us through this airport with all its many checks on tickets, excess baggage, passports, and all the rest. The whole thing is a sort of mystery to me. Yet it gets done and I have some breakfast.

It is with real regret that we leave Mr. Melnikov and Eddie. They have been extremely helpful.

At this point Mr. Melnikov reminds me that within the Soviet Union we traveled 10,000 kilometers by air and 3,000 by car, not counting the many trips from the various centers to the farms and institutes.

We go into the big jet plane and the wheels are in the air for Copenhagen at 7:30. They are down at Copenhagen at 7:32 a.m. (9:32 Moscow time).

Although few trips could have been more interesting than this one to the Soviet Union, customs there are quite different than in our country or in western Europe. Here in this nice airport at Copenhagen it already seems as if we were practically home. We have both milk and tea and look at the beautiful silver and porcelain in the nice airport shops.

We leave Bulik and Donnan at Copenhagen since they will remain in Europe for a few days.

At 10:35 the wheels are up on Scandinavian Airlines for London.

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At 10:25 the wheels are up on Scandinavian Airlines for London.

I complete a series of short notes I began in my notebook on first-hand impressions in the Soviet Union:

1. The great friendliness of the people.
2. Excess of labor on many farms.
3. Mechanization is being pushed a bit too fast for some communities, while the smaller tasks are done by very old-fashioned methods.
4. So much emphasis on machines leads to neglect of hand work, such as weeds in odd places, and the like. Few farms are neat.
5. The weed problem is very serious: (a) reduces yields and (b) results in excess tillage, which, in turn, reduces the quality of soil structure.
6. Generally, the country road system is very poor. Roads are rough, dusty, and muddy. Large trucks cannot be used and small ones are badly shaken. Even main roads have asphalt surfaces without proper subgrade. Enough wear and tear on machines could be saved to pay for proper roads.
7. All jobs on farms and all farms have "norms" and bonuses for over-fulfilling the "plan." Of course all workers and farm managers seek to have low "norms" so they can have bonuses. I did not see abuses but there are obvious opportunities for bribery among farm managers and officials of the rayons and oblasts that set the farm norms.
8. All officials are extremely anxious to make a good impression. Every inadequacy that we would be likely to notice is pointed out in advance and explained.

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8. All officials are extremely anxious to make a good impression.

Every inadequacy that we would be likely to notice is pointed out in

advance and explained.

9. Commonly, when a suggestion is made by one of us the remark is, "Yes, we are doing that," but in some distant place, or "We plan to do that during next season."

10. Obviously the struggle to get ahead within the bureaucracy is terrific - something like the struggle among some American business men to make money primarily for the sake of the power it gives them.

11. They try very hard - almost too hard - for the big effect perhaps more for the symbol than for the substance. Thus a large undertaking may look bad in western eyes from the accidental omission of items we take for granted. This struggle for the symbols of progress indicates some sort of inferiority complex.

12. The farm people will come along well if given a chance. The transfer of machines to the farms and the better prices are bound to help. Certainly they want peace: their memory of the last war is keen and horrible. They want more comforts. But country people are too many and policy is controlled more by city people and by trade union leaders within the Communist Party.

13. The main soil problems:

(a) Irrigation

i. Silting

ii. Salinity

iii. Drainage

(b) Drainage of peat soil.

(c) Rice land preparation.

(d) Erosion control.

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(Research and application both poor, especially on engineering phases.)

(e) Soil blowing. (Generally not greatly serious.)

(f) Over cultivation.

(g) Fertilization, but progress is good.

14. Nearly all agriculturists in the USSR know the system of soil classification - certainly to a far greater degree than comparable agriculturists in the USA. Some soil maps are excellent; others not so good. The maps of farms are less detailed than ours, and are line maps.

15. I was amazed to see the extent of new construction, which goes on everywhere. It is remarkable how they have been able to reconstruct the cities, towns, and villages destroyed by the Germans. The destruction might be comparable to 60 to 75 percent destruction of all houses, factories, museums, universities, and so on east of the Mississippi River in this country. In nearly every town and city one sees great steel cranes on the skyline building large structures of all kinds.

16. The enormous effort being put into education and into research is impressive. Hard-working students are paid while in the technical schools or universities.

17. Soviet scientists are far more familiar with our scientific publications than Americans are with theirs because of the excellent abstracting and translation services.

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18. The Soviet people are intelligent and hard working.

They want more comforts and I feel sure that war would be very unwelcome; and so would a strong Germany.

Although very hard to do now I try to summarize what I may have learned of direct application to US agriculture:

1. Highly adequate laboratories and other facilities for research and teaching in soil science have been constructed, even in areas scorched by the war only 13 years ago.

2. Excellent services are provided for giving agricultural abstracts scientists /and translations of foreign research papers and scientific books.

3. Excellent planning to avoid the use of soils for cultivation that are subject to erosion or soil blowing.

4. Women are trained in soil science and other phases of agriculture. Many women hold responsible positions in these fields.

5. All agriculturists, and especially agronomists, are given thorough training in the national scheme of soil classification.

6. The azotogen and phospho-bacterin used widely to treat seeds may have usefulness in the United States.

7. Some new devices for measuring water in irrigation canals may be useful here.

8. A new type of horizontal turbine seen at Tashkent may be useful.

9. In the "new lands" recent experience suggests widely spaced windbreaks of trees in double rows, separated by rows of shrubs.

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10. On many farms, the early snow is ridged in the fields to help hold additional snow.

11. Occasional rows of sunflowers have been found helpful in holding snow on the fields.

The wheels are down again in London at 1:16 p.m.

We transfer over to the Pan American office and get our baggage reasonably well straightened out. I find that the Embassy in Moscow did not check our tickets through as they said they would. We will have space but there is uncertainty about sleepers. A courteous young man at the desk says he can promise me one personally but that he can't do it officially until we are ready to sail.

Nelson and Cline remain at the airport while Thorne, Allaway, and I take a quick trip to the City.

We have a few minutes at Liberty's on Regent Street. It seems very good to get another glimpse of the heart of London. It is a great pity we must hurry back.

I try to call the Muirs but no one answers. Finally we all get berths except Dr. Cline, who insists he doesn't mind.

The wheels are in the air for New York at 7:20. As usual, dinner drags out for a long time. But I finally get to bed about 10:30 p.m. (or 5:30 N. Y. time.)

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We transfer over to the Pan American office and get our baggage

reasonably well straightened out. I find that the Embassy in Moscow

did not check our tickets through as they said they would. We will

have space but there is uncertainty about sleepers. A courteous

young man at the desk says he can promise me one personally but that

he can't do it officially until we are ready to sail.

Nelson and Cline remain at the airport while Thorne, Allaway,

and I take a quick trip to the City.

We have a few minutes at Liberty's on Regent Street. It seems

very good to get another glimpse of the heart of London. It is a

great pity we must hurry back.

I try to call the Mire but no one answers. Finally we all get

berths except Dr. Cline, who insists he doesn't mind.

The wheels are in the air for New York at 7:30. As usual, dinner

drags out for a long time. But I finally get to bed about 10:30 p.m.

(or 5:30 N. Y. time.)

August 21

I sleep for five hours as one day has turned into the next. We have been in and out of the airport at Iceland. The stewardess gives me a glass of milk with which I wash down 2 sleeping tablets and go back to bed. I am up at 4:30 after a good long rest.

The wheels are down at Idlewild in New York at 7:20 a.m.

We are through customs easily and over to American Airlines. We are scheduled to leave at 8:45 but the plane is delayed.

The arrangements for going through customs at Idlewild are very convenient now but the airport otherwise is dirty, noisy, scattered about, and badly overcrowded.

Finally the wheels are in the air for Washington at 9:52 and down in Washington airport at 11:10.

Mrs. Kellogg meets me, Oh it is so good to be once more back home.

oOo

March 21

I stayed at the home as the day was cloudy and the heat.
No more been in and out of the airport as I should. The airplane
was not a glass of milk which I wash down. I should like to
and go back to bed. I should like to go to bed after a good night's rest.
The waste is down in the field in New York at 7:30 a.m.
We are through the airport and then to the airport at 11:10.
We are scheduled to leave at 8:30 but the plane is delayed.
The arrangements for going through customs and immigration are very
convenient now but the airport authorities are strict. I should like to
about, and I am very overwhelmed.
Finally the waste is in the air for Washington at 9:11 and
down in Washington airport at 11:10.
Mrs. Kelllogg meets me. Oh it is so good to be with you back

home.

SOME APPROXIMATE CONVERSIONS

	Yield per acre in American units							
Yield Per Hectare (Metric)	Pounds	Potatoes bu. ^{2/}	Sugarbeets, Fodder, etc. tons	Wheat bu. ^{3/}	Corn bu. ^{4/}	Oats bu. ^{5/}	Rice bu. ^{6/}	Cotton bales, lint ^{7/}
1 ton ^{1/}	892.55	14.8		14.8	15.9	27.9	19.8	.62
2 tons	1,785.10	29.7		29.7	31.9	56.0	39.7	1.25
3 tons	2,677.56	44.6		44.6	47.8	83.7	59.5	1.87
4 tons	3,570.20	59.5		59.5	63.1	111.6	79.3	2.51
5 tons	4,462.75	74.4	2.23	74.4	79.7	139.5	99.2	3.13
	<u>Tons</u>							
10 tons	4.47	148.8	4.47					
20 tons	8.93		8.93					
40 tons	17.86		17.86					
50 tons	22.32		22.32					

<u>CONVERSION TABLE</u>		
One kilometer	=	.62137 mile
One meter	=	39.37 inches
One centimeter	=	.3937 inch
One millimeter	=	.03937 inch
One inch	=	2.54 centimeters
One liter	=	1.0567 quarts

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One liter	=	1.0567 quarts
A liter of water	=	2.2046 pounds
One cubic meter	=	1.308 cubic yards
One centner	=	220.46 pounds
One metric ton	=	2,204.6 pounds
One hectare	=	2.47 acres
One acre	=	.4047 hectare

- ^{1/} Metric ton
- ^{2/} 60 pounds
- ^{3/} 60 pounds
- ^{4/} 56 pounds
- ^{5/} 32 pounds
- ^{6/} 45 pounds
- ^{7/} 35% conversion

Carbon and nitrogen values were obtained on a few soil samples.

Dr. L. T. Alexander gave me the data late in December 1958, as follows:

	N percent	C percent	C/N ratio
Poltava: Slightly washed Gray-Forest soil, 0-4"	0.173	1.87	10.8
Poltava: Chernozem, 0-12"	0.276	3.77	13.6
Tashkent: Sierozem, 0-4"	0.120	1.19	9.9
Akmolinsk: Chestnut, 0-4"	0.297	4.03	13.6
Akmolinsk: Chernozem, 0-4"	0.389	4.60	11.8

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285 LAFAETTE ST. N.Y.C. U.S.A.

